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FILE

VANDUISHEVA (Mme N. I.). Пятнистость Люцерны и меры борьбы с ней. [Lucerne blotch and measures for its control.]—Докл. Акад. сельск. Наук Ленина [Rep. Lenin Acad. agric. Sci.], **23**, 1, pp. 23–28, 1958.

In Voronezh and other districts in U.S.S.R. *Ascochyta imperfecta* [36, p. 104] and *A. sp.* are very widespread on lucerne. The second differs from the fungus on peas (*A. pisi*) as shown by negative results in inoculation to peas and [? broad] beans with *A. sp.* from lucerne. For the control of the disease, yearly crop rotation, summer sowing, fertilizers with P and K, and selection of healthy seeds are recommended.

DAVIES (R. R.) & ISAAC (I.). Dissemination of *Verticillium albo-atrum* through the atmosphere.—*Nature, Lond.*, **181**, 4609, p. 649, 1958.

Following the trapping of colonies of *V. albo-atrum* [37, p. 176] on plates of Dox's agar in a lucerne stand by Isaac in 1954–56 and the isolation of this fungus from house dust from Edinburgh and from the atmosphere in a garden in urban London by Davies, an investigation was initiated to determine the number of *V. albo-atrum* spores in the air within and above lucerne crops at 4 centres. The apparatus used was the slit sampler [37, p. 142], suction being provided by a geared, hand-operated pump unit. From 150 l. samples of air within diseased crops the numbers of *V. albo-atrum* colonies isolated were: in Berks. 6, in Cambridge (mildly infected) 1, and near diseased straw being turned over 4, in Norfolk 12; in 200 l. air sampled in an open field 150 yd. downwind from a diseased crop being mown, 12; in 50 l. air in 'Green shed' of lucerne drying factory, 3, and when a lorry tipped a load of infected lucerne, 30–40; and in Swansea (180 l. air) 6. In 2 healthy lucerne crops and in 1 meadow no colonies were obtained. These results indicate that the number of spores of *V. albo-atrum* in and above infected stands of lucerne is sufficiently high to suggest that the spread of the disease in this crop may occur by means of wind-blown spores.

GOTTLIEB (D.), ROMOLI (MICHELINA), & ROGERS (M.). Alfalfa wilt in Chile.—*Plant Dis. Repr.*, **41**, 12, pp. 1041–1044, 1957.

From wilted plants found in all the 51 fields surveyed in the lucerne-growing areas of Chile a bacterium was isolated which resembled *Corynebacterium insidiosum* [map 67]; its identity has yet to be confirmed. Conditions are ideal for the rapid spread of the pathogen as most lucerne is grown under irrigation. Caliverde seemed to be relatively resistant.

SETH (J.) & DEXTER (S. T.). Root anatomy and growth habit of some Alfalfa varieties in relation to wilt resistance and winter-hardiness.—*Agron. J.*, **50**, 3, pp. 141–144, 3 fig., 1958.

In these studies at Michigan State University the anatomy of 5 lucerne vars. resistant to wilt (*Corynebacterium insidiosum*) [37, p. 102] could in no way be differentiated from that of 5 susceptible ones.

PERIŠIĆ (M. M.). Prilog proučavanju biologije i suzbijanja *Puccinia helianthi* Schw. [A contribution to the study of the biology and control of *Puccinia helianthi* Schw.]—*Posebna Izd. Inst. Zasht. Bilja, Beograd*. [Spec. Edit. Inst. Plant Prot., Beograd] **8**, 52 pp., 20 fig., 1957. [English summary. 72 refs.]

This detailed study on *P. helianthi* [31, p. 187] was carried out in 1950–54 at the Faculty of Agriculture, Zemun, and under natural conditions in Yugoslavia on 15

vars. of sunflower and other spp. of *Helianthus*. The aecidia appear in autumn on self sown plants and may also be found at the end of spring on mature plants. The aecidiospores germinate at 6–25° C. and though they begin to germinate after 90 min. at 16° (the opt. temp.) infection required 10 hr. Crossing of pycniospores is brought about by aphids. The opt. temp. for uredospore germination is 18°, infection taking 4 hr; the incubation period is 5 days at 18°, 8 at 14°, and 7 at 22°. The uredospores can overwinter. Infection is seed borne [but cf. **36**, p. 591] and also carried over on stems and leaves left in the fields, and by teliospores on the soil surface.

P. helianthi did not infect *Helianthus tuberosus*. Novosadska 4 and Horgoš proved more resistant to the disease than Novosadska 8 and Saratov 169, which are very susceptible. It is suggested that there are two biotypes of the pathogen in Yugoslavia. Bordeaux mixture, 1% and 2%, gave the best control; actidione was too phytotoxic and S was ineffective.

LEGG (J. T.) & ORMEROD (P. J.). **The nickel content of Hop plants with reference to nettlehead symptoms.**—*Rep. E. Malling Res. Sta.*, 1957, pp. 129–132, 1958.

Results of experiments with the nettlehead-susceptible hop variety Early Prolific in pot culture supported previous findings [**36**, p. 553] that there is a high Ni content in plants affected by nettlehead virus, but this is thought to be a symptom rather than a predisposing factor in the disease [**37**, p. 51].

SEWELL (G. W. F.) & WILSON (J. F.). **Weed hosts of the 'progressive' Hop strain of *Verticillium albo-atrum* Reinke and Berth.**—*Rep. E. Malling Res. Sta.*, 1957, pp. 126–128, 1958.

Isolates of *V. albo-atrum*, very virulent on hop, were isolated from 4 common weeds, *Chenopodium album*, *Senecio vulgaris*, *Solanum nigrum*, and annual nettle (*Urtica urens*) [**35**, p. 875], in badly wilted hop gardens [in S.E. England] in 1955 and 1956. After the first appearance of wilt in the crop in such gardens the weeds are usually allowed to grow unchecked until picking time, when they are cut down and ploughed in, because repeated cultivation has been found to increase spread. Two conflicting factors concerned are the beneficial effect of an annual weed flora in reducing the period of survival of *V. albo-atrum* in dead tissues, and the possible harmful effect of living hosts in which the pathogen can persist. At present these two cannot be resolved.

SCHUMANN (K.). **Untersuchungen über den Alkaloidgehalt virusinfizierter *Datura* Pflanzen.** [Studies on the alkaloid content of virus-infected *Datura* plants.]—*Pharmazie*, **12**, 8, pp. 524–528, 1 fig., 1957. [16 refs.]

Further studies by titrimetric and paper-chromatographic methods are reported from the Phytopathologisches Institut, Karl-Marx-University, Leipzig, Germany, on the alkaloid contents of normal *Datura* plants (mostly *D. stramonium* vars. *tatula* and *inermis*) and those inoculated with potato viruses X (ring-spot strain H. 19/M) or Y, or a mixture of both [**37**, p. 365].

At first the alkaloid content increased and at maturity diminished in relation to that of healthy ones, but there was no difference in the ratios of hyoscyamine and scopolamine (1:3 and 3:1, respectively). At the stage of early maturity, however, the ratio of hyoscyamine to scopolamine was larger in the infected (3:1) than in the healthy (1:1). The disparity at the several stages of growth is attributed to the accelerated development of the infected plants.

BUNKINA (Mme I. A.). **Болезни Женьшеня и борьба с ними.** [Diseases of Ginseng and their control.]—*Защ. Раст.*, Москва [*Plant Prot.*, Moscow], 1957, 4, pp. 39–40, 3 fig., 1957.

Pathogens of ginseng in the Primorye, U.S.S.R., where the crop has recently been

introduced, include *Phytophthora cactorum*, *Colletotrichum panacicola*, *Alternaria panax*, *Fusarium* spp., *Rhizoctonia* [*Corticium*] *solani*, and *Ramularia* spp., all of economic importance. Irrigation and choice of planting sites are poor and there are heavy losses in fields exposed to the sun. Against *Fusarium* spp. and *C. panacicola* seed treatment for 15 min. in 0.25% calcium permanganate or 40% formalin (1:300) proved effective and did not reduce germination; the best results, however, were obtained with NIUIF-DRB and thiram on the seed, and soaking the roots of seedlings for 15 min. in 1% Bordeaux or 0.25–0.3% calcium permanganate before transplanting gave very good control. Spraying the plants with 0.5% Bordeaux before the appearance of the first leaves, when they had developed, and again (with 1%) 15 days later was also effective against almost all the diseases.

GOSS (R. C.). **Studies on the control of Verticillium wilt of Peppermint with CBP-55.**—*Plant Dis. Repr.*, **42**, 2, pp. 177–179, 2 graphs, 1958.

At Purdue University, Lafayette, Indiana, good control of peppermint wilt (*V. albo-atrum*) [35, p. 633; 37, pp. 104, 287] was obtained by soil injection with CBP-55 [chlorobromopropene]. When 20 × 50 ft. plots were treated with 0, 40, 80, and 120 gal./acre at 2 week intervals, the percentage areas estimated by quadrant observations to be free from infection were 61.4, 75.1, 79.1, and 85.4 for the respective treatments.

DALY (J. M.) & INMAN (R. E.). **Changes in auxin levels in Safflower hypocotyls infected with Puccinia carthami.**—*Phytopathology*, **48**, 2, pp. 91–97, 3 graphs, 1958. [24 refs.]

Further studies at the University of Nebraska, Lincoln [cf. 36, p. 616], were aimed at establishing whether changes in ether-soluble auxins, especially indoleacetic acid, could account for host responses in the early stages of the infection. Ether extracts from safflower hypocotyls at different stages of development, partially purified by re-extraction with isopropyl alcohol and paper chromatography, were compared. Bioassay of chromatogram areas with sections of oat coleoptiles indicated that growth activity was consistently associated with the area corresponding to indoleacetic acid, and this was significantly more in evidence in extracts from rust-infected than from healthy tissues. Other growth materials, possible precursors of indoleacetic acid, were detected in diseased tissue before symptoms appeared, but could not be identified. There was also a correlation between hypocotyl development and the presence of indole compounds.

The similarity of the elongation of excised safflower hypocotyls in response to indoleacetic acid to that obtaining after infection suggests that higher auxin levels may cause the initial increase in growth and metabolism of the host which occur during rust infection, resulting in abundant substrates for mycelial development of the parasite. The possible mechanisms whereby auxin levels may be increased and their significance are discussed with reference to the investigations of other workers [cf. 37, p. 224].

SCHUSTER (M. L.). **Internal uredial sori of Puccinia carthami with reversed polarity.**—*Phytopathology*, **48**, 3, p. 178, 1 fig., 1958.

A note from the University of Nebraska, Lincoln, reports the occurrence of uredosori orientated toward the centre of safflower stems in cavities between cortex and stele [cf. 31, p. 631]. Normal sori were produced externally.

PAWAR (V. H.) & PATEL (M. K.). **Alternaria leaf spot of Ricinus communis L.**—*Indian Phytopath.*, **10** (1957), 2, pp. 110–114, 1958.

As a result of *Alternaria* leaf spot (*A. ricini*) [35, p. 661] assuming serious proportions in Bombay State, studies were undertaken on the physiological characters

and host range of the fungus at the College of Agriculture, Poona. Cultures produced spores at 20° C.; min. growth temp. lies between 5° and 10°, opt. near 28°, and the max. between 35° and 40°; the opt. for spore germination lies between 25° and 30°. The fungus requires organic N sources like asparagine and aspartic acid and C compounds like xylose, maltose, raffinose, etc. It grows best between pH 4.8 and 5.5.

The fungus also attacks *Jatropha pandurifolia* and *Bridelia hamiltoniana*.

NIXON (R. W.). Differences among varieties of the Date palm in tolerance of Graphiola leaf spot.—*Plant Dis. Repr.*, **41**, 12, pp. 1026–1028, 1957.

In an experimental planting of date palm varieties at Weslaco, Texas, rated for tolerance of natural infection by *G. phoenicis* [17, p. 504], Kustawy, from Iraq, developed only light infection. The disease is prevalent in areas of continuously high humidity. In a planting near Crystal City, where the R.H. is 10% lower, the disease is less severe and has been controlled satisfactorily with Bordeaux mixture.

STRICKER (H.). Die Bedeutung der mineralischen Düngung im Pflanzkartoffelbau.

[The importance of mineral fertilizing in seed Potato cultivation.]—*Dtsch. Landw.*, **9**, 2, pp. 73–75, 1958. [35 refs.]

The results of experiments at the Institut für Acker-und Pflanzenbau, Humboldt University, Berlin, are presented and discussed in relation to previous observations on the effect of mineral fertilizers on [unspecified] potato viroses [cf. **31**, p. 571; **34**, p. 389, and below]. It is concluded that, in general, the level of mineral N should range from 30 to 50 kg./ha., the corresponding rates recommended for P₂O₅ and K₂O being 60–90 and 80–100, respectively.

STRICKER (H.). Untersuchungen über die Beeinflussung des Pflanzgutwertes der Kartoffel durch die mineralische Düngung in einer Abbauage. [Studies on the influence of mineral fertilizing on the seed value of the Potato in a 'degeneration area'.]—*Dtsch. Landw.*, **9**, 3, pp. 113–118, 4 graphs, 1958.

In the current experiments the influence of mineral fertilizers [see above] on the incidence of viroses in the progeny of treated potato crops was apparent in the Ackersegen variety under conditions both favourable and unfavourable for infection; in Capella, on the other hand, a clear-cut response to the amendments was observed only in the favourable. Of the various combinations tested, NPKCl was the most adverse to the health of the stands and no fertilizer and P the least so. On light to medium soils a complete fertilizer with high P, moderate N, and exclusively Cl-free K is regarded as conducive to a healthy crop.

MÜNSTER (J.). Methode zur Beobachtung der Entwicklung der virusübertragenden Blattläuse zwecks Ansetzung des Früherntetermins und dessen Rückwirkungen auf den Ertrag an Saatkartoffeln. [Methods for the observation of the development of virus-transmitting aphids with a view to determining the date for early harvesting and the effects of this on the yield of seed Potatoes.]—*Europ. Potato J.*, **1**, 1, pp. 31–41, 4 graphs, 1958. [French and English summaries.]

A discussion of the operation and economics of early potato-harvesting in Switzerland [36, p. 115] to escape major virus infection of the 'seed'.

BARTELS (R.). Die Konzentration des Kartoffel-Y-Virus in Kartoffelpflanzen. [The concentration of Potato virus Y in Potato plants.]—*Zbl. Bakt.*, Abt. 2, **111**, 6–7, pp. 185–190, 2 graphs, 1958.

Further studies [37, p. 178] are reported from the Institut für Virusserologie, Brunswick, Germany, on potato virus Y [see below]. The precipitin test was applied to outdoor and greenhouse plants of var. Bona, the conc. in every leaf in batches of

5 plants being determined at regular intervals. At the beginning of July the lower leaves already contained a relatively large quantity of virus (titre 1:8), while the amount in the upper ones was very small. Later the max. shifted from the basal to the middle leaves and culminated at flowering in the shoot tip (1:16). Withering was accompanied by a general regression and at the inception of yellowing serological determination was no longer practicable.

MARCUS (O.). **Über das Auftreten von Primärherden auf Blättern verschiedener Kartoffelsorten nach Beimpfung mit einem starken Y-Virus Stamm.** [On the development of primary foci on leaves of different Potato varieties after inoculation with a severe strain of virus Y.]-*Zbl. Bakt., Abt. 2*, **111**, 6-7, pp. 197-203, 5 fig., 1958.

A strain of potato virus Y [see above] causing severe necrosis was isolated from a Yugoslav variety and inoculated into 33 varieties at the Pflanzenschutzamt, Kassel-Harleshausen, Germany. The isolate did not differ serologically from other strains of virus Y. Distinct to prominent primary foci developed on inoculated leaves of 18 varieties, including Ackersegen, Böhm's Mittelfrühe, Forella, Heida (especially pronounced), Ostbote, Parnassia, and Sieglinde; on a further 11 the lesions were indistinct to faint, while 4 did not react at all. The necroses are interpreted as hypersensitivity responses which do not protect the host against subsequent systemic infection. Inoculum of the virus from tobacco was more pathogenic to 3 varieties than that from potato [33, p. 108], while 2 others reacted in the same way to both sources.

WEBB (R. E.) & SCHULTZ (E. S.). **Possible relation between haywire of Potato and big bud of Tomato.**-*Plant Dis. Repr.*, **42**, 1, pp. 44-47, 4 fig., 1958.

The symptoms observed on grafting to tomato at Beltsville, Maryland, indicated that haywire of Dazoc potatoes [33, p. 751] in Nebraska may be caused by tomato big bud virus. When stem sections from infected tomatoes were approach-grafted to healthy plants of seedling 41956, Dazoc, and Katahdin potatoes the symptoms produced were identical with those induced by grafting with the original virus source.

WALKINSHAW (C. H.) & LARSON (R. H.). **A soil-borne virus associated with the corky ringspot disease of Potato.**-*Nature, Lond.*, **181**, 4616, p. 1146, 1958.

At the University of Wisconsin, Madison, a sap-transmissible, rod-shaped virus carried in the soil was recovered from Sebago potato tubers affected by corky ring spot [spraing: 37, p. 108] and from plants from diseased tubers, as well as from systemically infected potato seedlings, capsicum, and tobacco grown in the greenhouse in soil obtained from the infected field in northern Florida.

The virus, named 'potato corky ring spot virus', was related serologically to the viruses of potato stem mottle [27, p. 33] and tobacco rattle [potato stem mottle virus], but produced different symptoms. It remained infective after precipitation with 50% saturated ammonium sulphate and in undiluted tobacco sap heated for 10 min. at 80° C., but not at 90°.

GEHRING (F.) & BERCKS (R.). **Untersuchungen an mehrjährigem Nachbau von künstlich und natürlich mit Bukett-Virus infizierten Kartoffeln.** [Studies of several-year-old progeny of Potatoes artificially and naturally infected with bouquet virus.]-*Phytopath. Z.*, **31**, 3, pp. 289-299, 9 fig., 1958.

Experiments conducted since 1954 at the Institut für Virusserologie, Brunswick, Germany, in both greenhouse and field demonstrated the unrestricted re-transmission via the tubers of potato bouquet (tobacco ring spot) virus [35, p. 536] from Virginia potato grafted with infected tomato (Earlyana). The infection rate in

the progeny is very high. Earlier conceptions of the course of the virus disease and recovery therefrom were confirmed.

ŚWIEŻYŃSKI (K.), CZERWONIEC (Z.), & PRÜFFER (B.). **Występowanie wirusa S oraz 'Novego wirusa' na Ziemniakach w Polsce.** [The appearance of virus S and the 'new virus' on Potatoes in Poland.]—*Hodowla rośl. Aklim. Nasien.*, 2, 1, pp. 137–141, 1958. [Russian and English summaries.]

Tests of 3 plants each from different potato varieties by the means of the plate method [31, p. 254] for the presence of virus S [37, p. 368] and the 'new virus' (related or similar to virus M [36, p. 779]) showed that the older vars. Ackersegen and Bintje, as well as the new, Epoka, Flisak, and Kolektyw, were infected by virus S. Only 1 plant, of Arran Victory, gave a positive reaction to the new virus.

LEONT'ÉVA (Mme Y. A.). Новое вирусное заболевание Картофеля в Поволжье. [A new virus disease of Potatoes in Povlozh'e.]—С. х. Поволжья [*S. khoz. Povlozh'e*], 1957, 5, pp. 38–41, 1957. [Abs. from *Referat. Zh. Biol.*, 1958, 4, p. 194, 1958.]

A virus disease in the U.S.S.R., affecting mainly the vars. Volozhanin and Seyanets 181, caused the poor development and yellowish colour of the haulms, leaf crinkling, apical necrosis, and spindle tuber. In the second part of Aug. early tubers bore pinkish, slightly swollen blotches, 0.5–2 cm. in diam., surrounded by a cleft 1.2 mm. deep. Later the lesions darkened and extended further inwards. The yield was reduced by up to 70%. The author suspects that the disease is caused by a new strain of potato virus F [potato aucuba mosaic virus] or potato spindle tuber virus, or a complex of the two.

ULLRICH (J.). **Die physiologische Spezialisierung von *Synchytrium endobioticum* (Schilb.) Perc. in der Bundesrepublik.** [The physiologic specialization of *Synchytrium endobioticum* (Schilb.) Perc. in the Federal Republic.]—*Phytopath. Z.*, 31, 3, pp. 273–278, 2 fig., 1958. [English summary.]

Five varieties and 2 strains of potato were used as differential varieties at the Institut für physiologische Botanik, Brunswick, for the identification of 5 biotypes of *S. endobioticum* [37, p. 304] found in Germany. Biotype 1 produced symptoms only in Deodora; biotype 6 in Deodora, Ackersegen and NO-Nova; biotype 2 in breeding strain B in addition to these 3; biotype 8 in Ultimus in addition to these same 3; and biotype 7 in Deodora, Ackersegen, and breeding strain A. Mira proved resistant to all 5 biotypes.

GEDZ (S. M.). О природе и некоторых путях повышения иммунитета Картофеля к раку. [On the nature of the immunity of Potatoes from wart disease and some methods for increasing it.]—Агробиология [*Agrobiology*], 1958, 2, pp. 108–117, 1958.

In further experiments [37, p. 245] in the L'vov, Drogobych, and Stanislav districts, Ukraine, with the susceptible potato vars. Ella and Alma growing in soil infested with *Synchytrium endobioticum* [37, p. 304] the spring crop was practically free from infection whereas the autumn one was very severely attacked. On grafting susceptible to resistant varieties 41% of the new combinations were found to be highly resistant; Ella, Epron, and Seyanets 106, each on Ubel, and Seyanets 20 and 24 on Majestic gave good results.

BRENCHEY (G. H.). **Spraying and dusting against Potato blight.**—*Agriculture*, 64, 10, pp. 475–479, 1958.

In this comparative discussion of the methods used in the control of potato blight [*Phytophthora infestans*: 37, p. 302] it is noted that a large 18-row sprayer causes

less mechanical damage than a 12-row machine in high-volume ground spraying. Low-volume sprayers designed for herbicide applications can be used for copper sprays against blight but may injure the haulms if the booms are too low. Dusting machines require more fungicidal material to give control comparable with that achieved by spraying, e.g. in a Bordeaux type dust about 3 lb. metallic Cu/acre is applied. It is concluded that all methods can be equally satisfactory and failures are probably due to mistiming of the sprays or bad operating.

SMOOT (J. J.), GOUGH (F. J.), LAMEY (H. A.), EICHENMULLER (J. J.), & GALLEGLY (M. E.). **Production and germination of oospores of *Phytophthora infestans*.**—*Phytopathology*, **48**, 3, pp. 165–171, 8 fig., 1958. [31 refs.]

Following a summary of the published records of oospore production in *P. infestans*, the authors give a more detailed account of work at Virginia University, Morgantown, already reported [36, p. 549] and of further work at Fort Detrick, Maryland. Several of the 105 isolates, representing 14 potato races and 2 from tomato, from N. America and Europe, produced oospores in single culture, but when grown with any of 3 Mexican isolates (26 M, 42 M, and 43 M) on a number of solid and liquid media and in potato leaves oospore production was 10 times more abundant. Two mating groups were indicated, one comprising the 3 Mexican isolates and the other all the remaining isolates (including one Mexican, 66 M).

The sexual organs conformed to the description given by Pethybridge & Murphy (*Sci. Proc. R. Dublin Soc.*, **13**, pp. 566–588, 1913). The oospores germinated (1–10%) in dung infusion, potato-soil leachate, and a mixture of vitamins.

A culture derived from a single oospore from the pairing 42 M (race 1,2) × WV-4 (1,4) reacted as race 1,4, though differing in growth rate and colony type on Lima bean agar, while another from 42 M × 62 (race 3) behaved as race 0.

SCHICK (R.), SCHICK (E.), & HAUSDÖRFER (M.). **Ein Beitrag zur physiologischen Spezialisierung von *Phytophthora infestans*.** [A contribution to the physiological specialization of *Phytophthora infestans*.]—*Phytopath. Z.*, **31**, 3, pp. 225–236, 1958.

Of 979 samples of *P. infestans* [34, p. 393] from different parts of Europe tested at the Institut für Pflanzenzüchtung, Gross-Lüsewitz, Berlin, during 1954 and 1955, 65.3% were found to belong to race 4, 15.1% to race 1, 10.4% to race 1,4, and 2.8% to race 0. The more specialized races were found principally at breeding stations and on hybrids. In 1956 in a district far removed from breeding and research stations, only races 1 and 1,4 were detected in addition to race 4, thus establishing that these races occur close together in a very restricted area.

In a gene analysis of 34 *Solanum demissum* lines [37, p. 369] R₄ occurred far more frequently than R₁. From this, as well as from the results of the Müncheberger experiments in 1932, and the fact that crosses with *S. demissum* did not give rise to potato cultures of the R₄ type, the authors conclude that race 4 has been an integral part of the *P. infestans* field population in Europe and America for over 25 yr.

Samples gathered from commercial varieties in the field on 3 different dates revealed a varying frequency of the individual races. It was demonstrated that apart from race 4, races 0, 1, 1,4, 1,3,4, and a mixture of 1 + 4 can overwinter in the tubers.

A further resistance gene, R₆, was found in *S. stoloniferum*. It was established that this species possesses in addition a factor for resistance which does not readily fit into the international classification.

TOMIYAMA (K.), TAKAKUWA (M.), & TAKASE (N.). **The metabolic activity in healthy tissue neighbouring the infected cells in relation to resistance to *Phytophthora***

infestans (Mont.) De Bary in Potatoes.—*Phytopath. Z.*, **31**, 3, pp. 237–250, 4 fig., 1958. [German summary. 32 refs.]

In further studies on the resistance of potatoes to *P. infestans* at the Hokkaido National Agricultural Experiment Station, Sapporo, Japan [37, p. 370], using the resistant variety 41 089–8, one side of tuber slices of different thicknesses was inoculated with zoospore suspensions of race 0 of various concentrations. It appeared that when a given cell was infected, about 10 neighbouring cells were indispensable if the infected cell was to achieve practically complete resistance to the fungus.

The polyphenol content 24 and 48 hours after inoculation was least in thin slices (almost without resistance) inoculated with incompatible races; the thicker the slices the greater the content. The depth, expressed as the number of cells from the cut surface of the tuber, at which max. value of integrated metabolic activity caused by cutting [37, p. 179] was reached was 10–15, nearly the same as the number of cells adjacent to the infected one which are required to give practically complete resistance.

AMICI (ADRIANA). **Segnalazione di Oidio su Patata in Italia.** [Report of powdery mildew on Potato in Italy.]—*Agricoltura ital.*, **56** (N.S. 11), pp. 410–412, 1 fig., 1956. [Received 1958.]

In Sept. 1956 potatoes growing in experimental plots in the Province of Rieti were affected by powdery mildew (*Erysiphe* sp., probably *E. cichoracearum* [37, p. 458], but in the absence of perithecia the specific identity could not be definitely established).

A footnote states that G. Fogliani reported the disease at Voghera (Villa Morini) in 1955–6.

КОН'КОВА (Mme R. D.). Орошение в борьбе с увяданием Картофеля. [Irrigation in the control of Potato wilt.]—Сб. тр. Южного н. и. ин-та гидротехн. и мелior. [Sborn. Trud. Yuzh. N. I. Inst. hydrotech. melior.], 1956, 4, pp. 247–252, 1956. [Abs. from Referat. Zh. Biol., 1958, 2, p. 195, 1958.]

In the Stavropol' region, U.S.S.R., the wilt of potatoes caused by *Fusarium oxysporum* and physiological disturbances was checked very successfully by maintaining the soil moisture at no less than 85% during flowering and 80% afterwards.

VAN EMDEN (J. H.). **Control of Rhizoctonia solani Kühn in Potatoes by disinfection of seed tubers and by chemical treatment of the soil.**—*Europ. Potato J.*, **1**, 1, pp. 52–64, 1 fig., 1958. [German and French summaries.]

Trials from 1954–57 at the Instituut voor Plantenziektenkundig Onderzoek, Wageningen, showed initially that disinfection of seed tubers with an organo-mercury compound [composition not stated] reduced the incidence of sclerotia of *R. [Corticium] solani* [cf. 36, p. 347; 37, p. 305 and below] on the crop if it remained in the soil 24 days after haulm killing, but made little difference if it was lifted green. In 1955 soil disinfection with 200 kg. PCNB or 13 kg. zineb/ha. was used both with and without the organo-mercurial and the presence of sclerotia. Seed treatment increased yield even of apparently clean tubers, probably because mycelium of the pathogen may be present round the eyes. There was no effect on crop germination, but complete control was not attained, and 20% of the sclerotia still germinated after treatment; the use of clean seed tubers is therefore desirable in any case. Soil treatment, applied 6 weeks after planting, had no effect.

Soil treatment, however, with PCNB, 60–90 kg./ha., or HgCl₂ 16 kg./ha., broadcast at the time of planting, gave added control, and improved the appearance of the crop, but emergence was delayed and yields consequently depressed; thus the treatment is only worthwhile if *C. solani* attack is severe and would cause still greater loss.

TEN BOER (H.). **Het Rhizoctonia problem in Groningen.** [The *Rhizoctonia* problem in Groningen.]—*Landbouwwoorlichting*, **15**, 2, pp. 70–74, 1 fig., 1958.

The results of further efforts to solve the problem of infection by *Rhizoctonia* [*Corticium solani*] on potatoes in N. Groningen, Netherlands [35, p. 539 and above], again demonstrated the paramount value of clean 'seed'. Immersion for 20 min. [in an unspecified medium] increased the yield of diseased but not of sound tubers.

McKEE (R. K.). **Assessment of the resistance of Potato varieties to common scab.**—*Europ. Potato J.*, **1**, 1, pp. 65–80, 1 fig., 1 graph, 1958. [German and French summaries.]

At the Nottingham University School of Agriculture, Sutton Bonington, Leicestershire, a number of imported potato varieties resistant to common scab (*Streptomyces scabies*) and a number of British ones were examined in comparative trials in 1953–56 in the field on a site known to produce severe scabbing and in the greenhouse [37, p. 307]. For the latter, sprouting eyes, excised 1 week beforehand to permit suberization, were planted in pots containing steam sterilized, modified John Innes compost infected by incorporation of diluted homogenates of agar cultures of strains of the fungus. Max. infection was obtained in plants watered when the pots 'rang' if tapped [cf. 19, p. 112].

The infection rate was estimated both on the basis of proportion of surface scabbed [34, p. 811] and the severity of damage (i.e. the distortion caused). The results of greenhouse and field trials were closely parallel. Separation of resistant from susceptible varieties was achieved by the periderm test [33, p. 623] in the majority but not in all; the ferric chloride test [33, p. 555] did not give correlation. A number of isolates of the pathogen were found to differ greatly in respect of virulence but there was no evidence of physiological specialization.

RICHARDSON (L. T.) & BUCKLAND (C. T.). **Eradication of ring rot bacteria from contaminated Potato bags by moist heat treatment.**—*Plant Dis. Repr.*, **42**, 2, pp. 241–245, 1958.

Experiments at the Science Service Laboratory, London, Ontario, showed the thermal death point of the potato ring rot bacterium (*Corynebacterium sepedonicum*) on artificially infested jute fibres treated in air to vary with the moisture content of the air [cf. 37, p. 107]. At each of 3 R.H. levels (7–10, 22, and 42%) and a temp. of 70° C. mortality of the bacterium on fibres enclosed in ventilated steel capsules decreased from the centre of a bale of jute bags to the surface and was lowest when the capsules were suspended in the surrounding air, owing to the original moisture content of the jute. The data obtained are tabulated. Operation of such heat treatments would depend on the specific conditions prevailing in any test.

STUBBS (L. L.) & McLEAN (D. L.). **A note on aphid transmission of a feathery mottle virus of Sweetpotato.**—*Plant Dis. Repr.*, **42**, 2, p. 216, 1958.

At the University of California, Berkeley, a severe and a mild feathery mottle virus, both non-persistent, were isolated by aphids from sweet potato [34, p. 174]. They were distinguishable by their effects on the var. Jersey, more clearly on *Ipomoea setosa* and on 10 other spp. of Convolvulaceae. Primary symptoms of the severe virus on Jersey, developing within about 8 days, were random bright yellow spots or streaks on the leaves, becoming faint and enlarged, and finally coalescing into chlorotic areas bordering the main veins, and spreading into typical vein feathering. At high temps. (and possibly high light intensity) these symptoms became masked some 2 weeks later. Some stunting was induced. The severe isolate was transmitted efficiently by *Myzus persicae*, but less so by *Aphis apii* and *A. gossypii*.

HILDEBRAND (E. M.), STEINBAUER (C. E.), DRECHSLER (C.), & TATMAN (E. C.). **Studies on Sweetpotato stem rot or wilt and its causal agent.**—*Plant Dis. Repr.*, **42**, 1, pp. 112–121, 1 fig., 1958.

This investigation at Beltsville, Maryland, on the cultural identity and pathogenic behaviour of *Fusarium oxysporum* f. *batatatis* [*F. bulbigenum* var. *bataas*: **36**, p. 552] showed that any 1 of the 5 parent cultures used, or its progeny in a high state of virulence, gave reliable information on the relative resistance or susceptibility of sweet potato varieties to stem rot or wilt. Filtration had no significant effect on results, thus the standard test procedure can be simplified by omitting this stage. Stock cultures should be transferred at 3- or 4-month intervals to maintain virulence.

KUSHMAN (L. J.) & RAMSEY (G. B.). **A preliminary report on the control of decay of Porto Rico Sweetpotatoes during marketing.**—*Plant Dis. Repr.*, **42**, 2, pp. 247–249, 1958.

Tests by the U.S. Dept Agric. at Raleigh, N. Carolina, and Chicago, Illinois, showed that in transit rot of sweet potatoes due to *Rhizopus* sp. [**35**, p. 323] could be largely controlled by dipping in 1% borax, or better, in 5 or 1% dowicide A, though even the weaker sol. was phytotoxic unless hexamine was added. The use of these chemicals for sweet potatoes is not yet approved by the Food and Drug Administration.

LANGFORD (M. H.). **The status of Hevea Rubber planting material for use in tropical America.**—*Turrialba*, **7**, 4, pp. 104–110, 5 fig., 1957. [Spanish summary.]

A long-range breeding programme in which high-yielding Eastern clones were crossed with jungle tree selections resistant to leaf blight (*Dothidella ulei*) [**35**, p. 716] is providing the hybrid progeny now replacing top-budded Hevea trees as planting material. The yield of Eastern clones top-budded at 6 ft. or more with low-yielding, disease-resistant clones does not differ significantly from Eastern clones with their own tops, other things being equal. Low yields must, therefore, be attributed to disease, damage, or poor growth. Blight-resistant clones on their own roots have the following advantages: trees for plantations can be produced more quickly and at a fraction of the cost of top-budded trees; a more uniform stand can be obtained; the trees are less subject to wind damage; and there is less panel decay in areas where *Phytophthora* [*palmyra*: **34**, p. 545; **36**, p. 209] is a problem. Yield data obtained to date on the blight-resistant hybrid progeny from test plots at Las Diamantes, Costa Rica, Entre Rios, Guatemala, and Belterra, Brazil, show that they compare favourably with those of Eastern clones at Entre Rios and top-budded clones at the other two centres. The yields are 3–5 times as high as those of blight-resistant clones from jungle tree seeds.

Lists of blight-resistant clones recommended for different areas must vary with tolerance of the major diseases in the area, adaptability to the soil, etc. The following are recommended for most rubber-growing areas of Mexico, Central America, and northern S. America: FX-2261, IAN-873, IAN-717, FX-2187, IAN-710, IAN-713, FX-1042, and FX-25. Of these the 1st 4 have a higher degree of tolerance of *Phytophthora* leaf fall and die-back than the others and are, therefore, preferable in very wet areas such as the Atlantic side of Costa Rica.

BOLLE-JONES (E. W.) & HILTON (R. N.). **Susceptibility of Hevea seedlings to Helminthosporium heveae attack in relation to their nutrient status.**—*J. Rubb. Res. Inst., Malaya*, **15**, 2, pp. 80–85, 1957.

Rubber seedlings grown in pots at 3 levels of N and 2 of Ca were exposed to natural infection by *H. heveae* [**32**, p. 397], augmented by inoculation. Data relevant to the effect of the disease on growth and the extent of spotting are tabulated, together

with the results of leaf analyses for N, P, K, Mg, Ca, and rubber [cf. **36**, p. 664]. The increased susceptibility at the higher N levels (but not Ca) was apparently associated with a reduction of P and K in the leaves.

The cost of root disease.—*R.R.I. Plant. Bull.* 34, pp. 11–14, 1 graph, 1958.

By the use of hypothetical figures based on experience, yields of rubber from healthy trees and from stands affected by root disease [*Fomes noxius*, *F. lignosus*, and *Ganoderma pseudoferreum*: **36**, p. 497 and below] of varying degrees of severity are expressed graphically to show the progressive loss caused over a period of 38 years. Severe root disease may reduce the cumulative yield by 40%, apart from increasing the cost of production. Calculated losses for light and moderate root disease are 20 and 30%, respectively. In an originally healthy stand loss of 1 tree/acre over 100 acres in the 10th year of tapping represents a loss in potential production of some 27,800 lb.

Root disease and replanting.—*R.R.I. Plant. Bull.* 35, pp. 35–41, 1958.

Certain modifications are noted to instructions concerning control of rubber root diseases (*Fomes lignosus*, *F. noxius*, and *Ganoderma pseudoferreum*) in Malaya given in an earlier bulletin [**34**, p. 545; see above]. Collar inspection as a periodic routine is no longer advocated and avoidance of root damage is considered more important than meticulous removal of every visible trace of fungal mycelium, remnants being conveniently killed by application of fungicides. A number of other suggestions are made concerning plantation field practices.

KHANNA (K. L.), SHARMA (S. L.), SRIVASTAVA (R. C.), & SINHA (J. N.). **Search for ratoon stunting disease of Sugarcane in Bihar.**—*Proc. Indian Acad. Sci., Sect. B.*, **47**, 1, pp. 1–14, 1 pl., 2 graphs, 1958.

Following a survey embracing detailed examination of 26 sugarcane vars. in 8 areas in Pusa and Patna in Feb.–Mar. 1955, the authors conclude that ratoon stunting is not present in the state of Bihar [**37**, p. 373].

ABE (T.) & KŌNO (M.). **On the horse-hair blight fungus on the Tea bush and its cultural characters.**—*Sci. Rep. Fac. Agric. Saikyo Univ.* 9, pp. 41–44, 1 pl., 1957. [Japanese. Abs. from English summary.]

The opt. temp. for growth on potato agar of *Marasmius equicrinis* from tea [cf. **24**, p. 121; **27**, p. 261] in the Kyoto prefecture, Japan, was 24–28° C. and the max. 36–40°. The thermal death point was 5–10 min. at 45° and within 5 min. at 50° moist heat; and over 10 min. at 45° and within 5 min. at 50° dry heat. Growth was opt. at pH 4.8–5.8, inhibited at 9.2, but possible at 3. Little resistance was shown to standard fungicides.

BERTOSSI (F.). **Coltura di virus di mosaico del Tabacco in tessuti vegetali diversi.** [The culture of Tobacco mosaic virus in various plant tissues.]—*Atti Ist. bot. Univ. Pavia*, Ser. 5, **14**, (1–3), pp. 346–350, 1957. [English summary.]

Inoculations conducted since 1950 of tobacco, bean [*Phaseolus vulgaris*], and cucumber plants with a strain of tobacco mosaic virus obtained from tissues of White Burley tobacco affected by crown gall [*Agrobacterium tumefaciens*] and used by Morel for experimental purposes since 1946 [**37**, p. 184] clearly demonstrated that the virus multiplies in the host *in vitro* in such a manner that even after 10 yr. and about 60 transfers it has not lost its virulence or changed the symptoms produced on these 3 hosts. It can multiply *in vitro* also in plants in which it is not normally found, such as *Scorzonera hispanica* and *Rubus fruticosus*; after the second transfer, inoculation to tobacco plants gave the usual symptoms.

WELKIE (G. W.) & POUND (G. S.). **Manganese nutrition of *Nicotiana tabacum* L. in relation to multiplication of Tobacco mosaic virus.**—*Virology*, **5**, 1, pp. 92–109, 3 fig., 1 graph, 1958.

At the University of Wisconsin, Madison, healthy seedlings of Havana 38 tobacco plants were grown in water culture at different levels of Mn, to which they responded with a gradient of growth and deficiency symptoms characteristic of this element. When the deficiency symptoms had become established, the 2 basal leaves of each plant were carborundum inoculated with tobacco mosaic virus. Decreased growth resulted at all levels of Mn and the intensity of the mosaic symptoms was reduced as levels decreased; infection of deficient plants reduced the deficiency chlorosis of the apical leaves.

In deficient tissues virus concentration reached a higher level than in normal tissues. This was true for systemically infected plants and inoculated leaf disks. It would appear that virus synthesis occurs more rapidly in chlorotic, Mn deficient tissue than in normal tissue.

SHIKATA (E.). **Effects of different pH-values upon Tobacco mosaic virus.**—*Mem. Fac. Agric. Hokkaido*, **3**, 1, pp. 154–161, 3 pl., 8 graphs, 1958. [Japanese. Abs. from English summary.]

At the Botanical Institute, Hokkaido University, Japan, collodion film preparations of tobacco mosaic virus [37, p. 270], made up at various pH levels, were compared under the electron microscope. At pH 6.8 the particles were monomers about 300 m μ or longer, scattered uniformly. As pH decreased there was a tendency to aggregation and at 3.3, the isoelectric point, the particles formed paracrystalline aggregates; at 2 and 1.1 they were dispersed again, with an increase in the proportion of those shorter than 240 m μ . At 0.5 they were denatured, the irregular globules formed being non-infective and giving no precipitin reaction. By contrast, raising the pH broke the particles but caused no aggregation; at 12.4 destruction and loss of infectivity and antigenicity were complete, small globules being deposited [cf. 37, p. 386].

МУКОЗОВА (Мме L. I.). Данные о зависимости накопления вируса Табачной мозаики от дыхания зараженных листьев Табака. [Data on the dependence of the accumulation of Tobacco mosaic virus on the respiration of the infected Tobacco leaves.]—*J. gen. Biol., Moscow*, **19**, 1, pp. 35–43, 2 graphs, 1958. [English summary.]

Experiments at the Moscow Institute of Genetics, U.S.S.R., showed that the multiplication of tobacco mosaic virus [34, p. 617] in tobacco and *Nicotiana glutinosa* leaves depends on the respiration of the infected tissue. In N and darkness it was significantly depressed, but there was no direct correlation as multiplication may continue when respiration is gradually decreased. The fact that 0.0001M 2,4-DNP caused inhibition indicated that oxidative phosphorylation was one of the links connecting the respiration processes and virus reproduction.

MARTIN (C.). **Étude comparée de l'activité de la polyphénoloxydase chez le Tabac sain et inoculé par une maladie de virus.** [Comparative study of polyphenoloxidase activity in Tobacco both healthy and inoculated with a virus disease.]—*C. R. Acad. Sci., Paris*, **246**, 13, pp. 2026–2029, 1 graph, 1958.

A study was made at the Station Centrale de Pathologie Végétale, C.N.R.A., Versailles, of the oxidations accompanying the synthesis of tobacco mosaic virus alone and combined with potato virus X in inoculated Samsun tobacco plants. One max. of polyphenoloxidase activity occurred 24–72 hr. after inoculation (168% of the level in the uninoculated for the group with mosaic alone and 210% for that with the complex) and another at the inception of symptoms 8–10 days after

inoculation. Similar results were obtained with tobacco inoculated with potato viruses X and Y, and also with [unspecified] tomato and dahlia viruses in their respective hosts.

It is postulated that an accumulation of phenolic compounds is responsible for the rise in oxidase activity in the cell sap of infected plants [see below].

MARTIN (C.) & MOREL (G.). **Accumulation de composés phénoliques chez les plantes atteintes de maladies de virus.** [Accumulation of phenolic compounds in virus-infected plants.]—*C. R. Acad. Sci., Paris*, **246**, 15, pp. 2283–2286, 1958.

In further studies to determine the possible role of phenolic compounds in the abnormal absorption of O by the cell sap of virus-infected tobacco plants [cf. **22**, p. 328 and see above], an accumulation was, in fact, demonstrated by means of paper chromatography in mosaic-diseased Samsun tobacco leaves. The compounds were identified as derivatives of caffeic acid, comprising chlorogenic acid and its isomers.

BERCKS (R.) & QUERFURTH (GERTRUD). **Untersuchungen über Stickstoff- und Virus Gehalt von Tabakpflanzen nach Infektion mit dem Kartoffel-X-Virus.** [Studies on the nitrogen and virus contents of Tobacco plants after inoculation with Potato virus X.]—*Zbl. Bakt., Abt. 2*, **111**, 6–7, pp. 169–177, 8 graphs, 1958.

At the Institut für Viroserologie, Brunswick, Germany, the growth of Samsun tobacco plants inoculated in the greenhouse during Nov. with strain H19m of potato virus X [**34**, p. 187] was distinctly retarded in comparison with healthy ones, whereas those inoculated in the following Mar. were little affected, if at all. No clear-cut correlation could be established between the N content of the leaves and the virus content [cf. **37**, p. 419].

BENDA (G. T. A.) & NAYLOR (A. W.). **On the Tobacco ring-spot disease. III. Heat and recovery.**—*Amer. J. Bot.*, **45**, 1, pp. 33–37, 1 pl., 1958.

In further studies [cf. **36**, p. 790] Turkish tobacco plants recovered from ring spot virus were exposed to a min. temp. of 35° C. for 10 days. Upon return to ordinary greenhouse conditions they developed typical ring spot symptoms, from which, if they continued to grow, they again recovered. One recovered plant was twice placed at high temp., and it went through a cycle of symptoms and recovery three times. The leaves of axillary shoots of heat-treated, recovered plants frequently developed typical symptoms. It is surmised that recovered leaves are symptomless only if they continuously contain virus and are evenly invaded. Prolonged exposure of plants to 35° probably inhibits the movement of virus and inactivates it. Recovered tissue freed from virus reacts with the formation of necrotic lesions when re-infected.

MORGAN (O. D.). **A leaf curl disease of Tobacco observed in Maryland.**—*Pl. Dis. Repr.*, **42**, 2, pp. 222–225, 7 fig., 1958.

A graft transmissible disease resembling a mild form of tobacco leaf curl virus, observed in 1950, is described from the University of Maryland Agricultural Experiment Station. In the course of 3 serial graft transmissions to tobacco and tomato symptoms disappeared within a year. It was also transmitted to *Datura stramonium*. No vector was found and the cause of the disease remains uncertain.

STEPHEN (R. C.). **Some observations on the incidence of frog-eye disease (*Cercospora nicotianae* Ell. and Ev.) in flue-cured Tobacco seedbeds.**—*Rhod. agric. J.*, **55**, 1, pp. 63–65, 1958.

In trials by the Tobacco Research Board of Rhodesia and Nyasaland early-sown seedbeds of Delcrest tobacco, maturing with the first rains or soon after, escaped

infection by *C. nicotianae* [37, p. 421] and did not require routine protective spraying. The need for this increased as sowing dates were delayed after mid-Sept. A spore trap [36, p. 715] collected no *Cercospora* conidia from the air in Oct., but their numbers increased thereafter, reaching a max. in Jan.

HILL (A. V.). **Blue mould of Tobacco—a review.**—*Tech. Pap. Div. Plant Ind. C.S.I.R.O. Aust.* 9, 16 pp., 1957. [67 refs.]

Knowledge of blue mould (*Peronospora tabacina*) in America and Australia [see below] is summarized. Infection occurs in cloudy, wet weather with mean daily temps. of 56–62° F. Further investigation is required of the role of *Nicotiana* spp. in initiating outbreaks in Australia and of factors influencing infection, its spread in the plant, and spore production and dissemination [37, p. 376]. Physiological strains may account for differences in behaviour in the two continents.

MANDRYK (M.). **Control of blue mould (*Peronospora tabacina*, Adam) in infected Tobacco seedlings.**—*J. Aust. Inst. agric. Sci.*, 23, 4, pp. 319–322, 1 fig., 1957.

In an investigation at the C.S.I.R.O. Division of Plant Industry at Canberra of the amount of benzol [benzene] required to inactivate *P. tabacina* between inoculation and sporulation [37, p. 58 and above], tobacco seedlings at 60–88° F. and under high R.H. were treated on 6 consecutive nights, starting 0–6 days after inoculation. With an evaporation surface 1/200 of the tray area, 5 ml. benzene within 24 hr. of inoculation killed the pathogen, but plants treated later became diseased; 10 ml. benzene 2 days after inoculation eliminated disease from 81% of the plants, 3–4 days after from 37%, and 5–6 days from 14%. Increasing the rate to 15–30 ml. progressively improved control, apparently by counteracting the deeper penetration of tissues by the pathogen. The higher rates produced growth abnormalities, but normal leaves were formed after discontinuation of the treatment. Applications at a late stage of incubation may only mask the disease, since the fungus became active again in a number of the plants after treatment.

In 24 hr. the mycelium was established in the epidermis and upper parenchyma; in the next 24 hr. it reached the intercellular spaces of the middle mesophyll.

VOVK (A. M.). Температурные условия возникновения эпифитотий вируса мозаики и стрики Помидоров. [Temperature conditions in relation to epiphytotics of mosaic virus and streak on Tomatoes.]—*J. gen. Biol., Moscow*, 19, 2, pp. 139–147, 1958.

In greenhouse experiments in 1953–57 at the Genetics Institute of the Acad. Sci. U.S.S.R. it was shown that tomato plants growing at the opt. temp. (20–28° C.) of air and soil did not develop symptoms of tobacco mosaic virus [34, p. 278], namely mosaic and streak. With an abrupt fall in temp. (down to 2° in the night) from 35° in daytime, the virus appeared very rapidly in up to 100% of some tomato varieties. Above 20° the virus did not develop. A temp. of 6–12° was very favourable for the development of the disease.

VLASOV (Y. I.). Устойчивость Томата к стрикку в зависимости от экологических условий. [Resistance of Tomato to streak in relation to ecological conditions.]—Докл. АН С.С.С.Р. [*C. R. Acad. Sci. U.S.S.R.*], N.S., 111, 5, pp. 1127–1129, 1956. [Abs. from *Referat. Zh. Biol.*, 1958, 4, p. 195, 1958.]

At the Moscow Station for Plant Protection, a marked increase in tomato streak [tobacco mosaic virus: see above] occurred when there was little sunlight and the temperature fell below the opt. for ripening. In the greenhouse the disease was reduced to nil when the temperature was kept constant.

КНЮБРИКН (N. D.). К вопросу определения устойчивости Томата к фитофторе. [On the question of the determination of Tomato resistance to *Phytophthora*.]—*Bull. appl. Bot. Pl.-Breeding*, **31**, 2, pp. 191–196, 1957. [Abs. from *Referat. Zh. Biol.*, 1958, 4, p. 195, 1958.]

Inoculation of cut shoots (in solution), leaves, and green and ripe fruits of potted tomato plants with *P. [infestans]*: **35**, p. 335] in Leningrad indicated that the most susceptible were the detached leaves and ripe fruits. Of 110 varieties tested, the most resistant were cherry-red, yellow, Kholodostoyka 1, early dark red 1563, Dutch Export, and early Volozh tomatoes and *L[ycopersicon] hirsutum*.

MACNEILL (B. H.). *Colletotrichum atramentarium* in field Tomatoes.—*Plant Dis. Repr.*, **41**, 12, p. 1032, 1957.

A wilt of field tomatoes in the Aldershot district of Ontario in 1956 and in the Woodstock area in 1957 proved to be caused by *C. atramentarium* [**37**, p. 206], though the symptoms were characteristic of *Fusarium* wilt. The fungus can, apparently, make limited systemic invasion, under certain conditions, leading to a general breakdown of the plant. Diagnosis of the causal agent of wilt in field tomatoes from symptoms alone may thus be unreliable.

DAVIS (D.) & HALMOS (S.). The effect of air moisture on the predisposition of Tomato to bacterial spot.—*Plant Dis. Repr.*, **42**, 1, pp. 110–111, 1958.

In inoculation experiments at the Merck Sharp & Dohme Research Laboratories, Rahway, New Jersey, with *Xanthomonas vesicatoria* on Bonny Best tomatoes [**36**, p. 297] when the 6th leaf was just emerging, the longer the plants were kept at 100% R.H. prior to inoculation the greater was their susceptibility. The younger expanded leaves were more susceptible than the older, the two oldest developing no lesions.

KEYWORTH (W. G.). Plant Pathology Report.—*Rep. nat. Veg. Res. Sta., Warwick*, **8** (1957), pp. 48–52, 1958.

This report, covering Oct. 1956–Sept. 1957 [cf. **37**, p. 1], includes reference to further work on chemical treatments for crook root [*Spongospora* sp.] of watercress by J. A. TOMLINSON and BRIDGET R. SMITH. In 2 further commercial trials with Zn frit applied to the beds in Oct. at 1 lb./sq. yd. infection was reduced from 95% to 5%. In laboratory tests zoospores were killed by water containing only 1 p.p.m. Zn, and sufficient Zn was liberated from the frit when the water contained approx. 20 p.p.m. CO₂, a conc. provided by the plants themselves.

W. G. KEYWORTH and J. SHEILA HOWELL, following further work on silvering disease of red beet [*Corynebacterium betae*], report that seed treated with harvesan, streptomycin, or erythromycin yielded mature crops in which the incidence of the disease was 8.5%, 0.3%, and nil, respectively, compared with 21.7% in the untreated. Harvesan may thus not be as good as previous trials have suggested. A few infected plants were present in stands raised from seed treated with 0.04% streptomycin, and the possible presence of resistant strains of the bacterium is being investigated.

Continuing studies of stem and fruit rot (*Didymella [lycopersici]*) of outdoor tomatoes, DOROTHY E. WAY found maneb superior to several other dithiocarbamate compounds in preventing and eradicating artificial infection at the stem base: the fungicides were applied 5 days before and 5 days after inoculation, respectively. Both treatments were more effective when followed by further applications at 3-week intervals; the lowest concentration for satisfactory control was 1% of the pure compound. Of the other compounds tested 3 applications of captan at 0.25% gave a high degree of protection, but did not act as an eradicant. Maneb might be used on plants already exposed to infection, plants farther from the outbreak

receiving protectant treatment with captan. Further studies on seed transmission gave negative results.

A. G. CHANNON isolated *Itersonilia* sp. from over 60% of cankered parsnip roots sent in from 53 localities in England and Wales. From 5 of these localities roots were infected by a *Phoma* sp., probably the same as that described by Ogilvie and Mulligan [13, p. 139], which proved highly pathogenic to parsnips, producing a purplish black lesion closely resembling that of *Itersonilia*, though often slightly darker. Pycnidia occasionally occurred in or at the surface of the tissue. Forms of *Itersonilia* isolated from diseased chrysanthemum and dahlia florets and other sources but differing from the parsnip isolates in some morphological characters were not pathogenic to parsnip. Several parsnip lines have been selected which are much less susceptible than a standard Offenham var.

J. M. WAY reports that thiram sprays give good control of *Botrytis* [*cinerea*] on lettuce in frames, while tecnazene dust worked into the soil before planting is almost as effective. In contrast with previous results tecnazene dusted on the plants did not greatly reduce the disease. Infection was most severe on the spring-planted crop, but 5 or 3 sprayings with thiram or captan before planting out gave good control.

Among F_3 families of lettuce examined by J. A. TOMLINSON and BRIDGET R. SMITH for resistance to mosaic virus, incidence of infection, assessed visually, varied from 0–100%. Apparently healthy plants were shown to contain the virus. The same workers also record the occurrence of big vein disease [cf. 37, p. 129] in lettuce at several farms in Surrey, where the most characteristic symptoms were chlorotic vein banding and a ‘puckering’ or ‘savoying’ of the affected leaves. The disease was transmitted to healthy plants by watering the soil in which they were growing with infected root sap, and also to healthy plants grown in soil in which affected plants had grown. Its occurrence in Britain has previously been suspected [at Long Ashton: 17, p. 5] but not confirmed.

Annual Report, Department of Agriculture, Kenya, 1956. Vol. II.—181 pp., 1958. 7/50 sh.

In the report of the senior plant pathologist [cf. 37, p. 135] R. M. NATTRASS (pp. 9–14) states that a root and stem rot of cassava at the Coast was associated with *Coprinus* sp. *Ramularia areola* and *Xanthomonas malvacearum* [map 57] were present on irrigated cotton. A disorder of pigeon pea at the Coast was characterized by short, longitudinal splits in the bark and a form of ‘stem pitting’, leading to die-back and collapse. Two leaf spots, *Cercospora cajani* and *Uromyces dolicholi* [map 236], on pigeon pea were recorded for the first time. In tea nurseries a root disease attributed to *Ganoderma* sp. was discovered, which destroyed the lateral root system, whereas *Armillaria mellea* causes ‘collar crack’. Citrus diseases included suspected psorosis virus [map 65]. One instance of Panama disease [*Fusarium oxysporum* f. *cubense*] was observed for the first time on bananas from the Kenya Highlands [cf. 35, p. 93].

Sclerospora sorghi [map 179] and *Physoderma maydis* [map 106] appeared on maize in the Coast Province, but not elsewhere, the former recorded previously in Kenya only on sorghum, the latter a new record for the colony. *Ophiobolus ory-zinus*, apparently a new record for E. Africa [cf. 33, p. 758], and *Leptosphaeria salvinii* [cf. 28, p. 355] caused foot rot of irrigated rice in the Highlands. *X. campestris* [map 136] occurred on *Brassica* spp. Gladioli were seriously affected by rust (*Uromyces gladioli*) [cf. 32, p. 367] and by the ‘neck rot’ phase of *Botrytis gladiolorum* [cf. 33, p. 29], the latter causing heavy losses to producers of cut flowers.

Ramularia armoraciae on horse-radish [map 229] is apparently a new record for Africa; other new records include *Geotrichum candidum* on potato tubers and *Heteropatella valtellensis* [cf. 35, p. 153] on carnations. *Diplodia zeae* [*D. maydis*]

on maize and *Elsinoe ampelina* on vine were recorded for the first time for over 20 years.

In the report of the senior plant breeder (pp. 29–35), H. C. THORPE records that a severe outbreak of stem rust (*Puccinia graminis*) [cf. 37, p. 136] developed in the lower wheat areas. Most vars. were affected, including Regent, previously field-resistant; the greatest collapse was suffered by var. 354. Oats were seriously affected by *P. graminis* [36, p. 686] and *P. coronata* [35, p. 590].

R. W. RAYNER, in the report of the plant pathologist and physiologist, Coffee Services (pp. 52–55), notes an epidemic of *Hemileia vastatrix*, as predicted from the weather in Jan. and Feb. Experimental inoculation with *H. vastatrix* was performed by using air drawn over a sporulating rust lesion to dissipate the vacuum in a jar containing a coffee leaf; the introduced spore cloud was allowed to settle on the leaf for 5–10 min. The experiment confirmed the view that the spores land only on the upper surface, and apparently reach the under surface with the help of rain. Penetration always occurs through the stomata, confined to the lower surface. Coffee leaves were therefore sprayed with fungicides on the upper surface, allowed to dry, then sprayed with distilled water to run off, and the drips collected. Germination of *H. vastatrix* spores in this liquid was very considerably reduced.

In the report of the Coffee Berry Disease Research Unit (pp. 66–88) J. NUTMAN states that present evidence from field experiments indicates economic control of *Colletotrichum coffeanum* [*Glomerella cingulata*: 37, p. 137] by means of organomercurial compounds to be possible. Fungicidal treatments before and after flowering are very important. Sometimes 90% of the flowers may be lost, an average in lightly affected plantings being 15%. Early spraying proved justified. A field study of *G. cingulata* indicated overwintering in the tissues external to the developing phellogen, in particular the stipular bracts at the leaf bases. The fungus can sporulate freely on stem and bract, whence it can directly invade the developing berries. It may invade the twigs before phellogen forms, and it can also, at times, penetrate the phellogen and in such cases deeply penetrate the tissues, producing a condition identical with that described as Elgon die-back [loc. cit.].

G. cingulata grows at 62–79° F. with a sharply defined optimum at 72°. Germination and penetration of the berry may be rapid, appreciable germination occurring in 2½ hr. under optimum conditions, and penetration sometimes occurring in 3 hr. The spores are readily killed by desiccation but a few can survive unfavourable humidities for 30 hr. and still cause limited infection. Spores from the brown blight stage (lesions on ripe berries) [36, p. 403] have a greater germination capacity and are more infective than those from green berries. The most probable common means of spread is carriage by workers, which is most likely to happen with spores from ripe berries at harvest.

One recent sample of material from an Upper Kiambu plantation showed 40% infection of the young, green berries; plantations previously unaffected are now being attacked. Serious outbreaks have occurred in one African Land Unit, where appreciable loss was caused at 5,200 ft.

Rapport annuel pour l'exercice 1956. [Annual report for the year 1956.]—*Publ. Inst. nat. agron. Congo belge, 1957* (hors sér.), 548 pp., 1 map, 1958. 160 Fr.

In the section of this report [cf. 36, p. 308] dealing with coffee and cacao it is stated (p. 84) that *Pestalotia coffeicola* [cf. 5, p. 159] was generally present in coffee nurseries. *Corticium salmonicolor* occurred sporadically in coffee plantings.

In the section dealing with phytopathological work at Yangambi (pp. 127–137), it is stated that a species of *Botryosphaeria*, not before reported on coffee, was isolated from spots on coffee leaves. Some 6-yr.-old oil palms were killed by *Armillariella* [*Armillaria*] *mellea*. Rubber clones Tj 16, BD 5, and Av 49 were very susceptible to *Oidium heveae*.

Four years' observations established the fact that ringing effectively prevents the colonization of coffee stumps by *Fomes lignosus* [cf. **36**, p. 309]. Under favourable conditions of humidity maize can become infected by *Helminthosporium maydis* [*Cochliobolus heterostrophus*: cf. **37**, p. 159] either by day or by night. Maize losses from leaf diseases are over 15%. Most maize varieties in the collection show satisfactory resistance to *Puccinia polysora* [cf. loc. cit.].

In the section dealing with the work done at Mvuazi Station (pp. 238–260) it is stated that attempts are in progress to control citrus tristeza virus by the selection of tolerant scion-stock combinations and propagation from nucellar embryos. In the Lower Congo psorosis virus [map 65] affects only the Washington navel orange.

In the section describing the work at the Mulungu-Tshibinda Station (pp. 451–468) the writer states that about 80% of the fruits of Arabian coffee at Mulungu bear latent infection by *Colletotrichum coffeanum* [*Glomerella cingulata*: **34**, p. 583, cf. above]. Tuzet [**35**, p. 469] gave more effective control of *Ramularia bellunensis* [on *Chrysanthemum cinerariifolium*] than did captan.

In the section concerned with the work of Rubona Station (pp. 502–520) it is stated that complete control of potato blight (*Phytophthora infestans*) was secured by 3 applications at intervals of 20 days of the following applied at 800 l./ha.: 2% zineb (containing 65% active product), 5% copper oxychloride, 5% tribasic copper sulphate, 1% dichlone, and 0.3% captan (all at 50%).

LYNN (C. W.). **Annual Report, Department of Agriculture, Northern Rhodesia, for the year 1957.**—21 pp., 1958.

In the sections of this report [cf. **34**, p. 707] dealing with plant breeding and plant pathology (pp. 14–16) it is stated that in fungicidal trials against groundnut leaf spot [*Mycosphaerella arachidicola*: loc. cit.; cf. **36**, p. 448] there was no significant difference between the various treatments and the untreated. Summer wheat at Mt. Makulu was severely attacked by *Helminthosporium sativum* [*Cochliobolus sativus*], which appears to be increasing in intensity. Hybrid seed of cassava varieties resistant to mosaic [virus] was received from Amani, Tanganyika Territory, and young plants were established; cuttings of selected mosaic-free plants received from infected areas in the Central Province and Barotseland were also raised for testing and multiplication.

Cabbage black rot [*Xanthomonas campestris*: cf. **36**, p. 380] is common in the wet season, and pea mildew [*Erysiphe polygoni*] and potato late blight [*Phytophthora infestans*] are prevalent and require attention. Experimental evidence demonstrated that leaf spot did not significantly reduce the yield of the Mwitunde groundnut variety, which appears to possess good field resistance. Agrosan seed treatment effectively controlled fungal 'black point' of wheat [cf. **21**, p. 9; **22**, p. 59; **37**, p. 228].

Starea fitosanitară în Republica Populară Română în anii 1953–1954 și 1954–1955.

[Phytopsanitary situation in the Romanian People's Republic in the years 1953–1954 and 1954–1955.]—*Met. Inst. Cerc. Agron. Acad. Repub. rom.*, N.S. **22**, 1957, 202 pp., 11 fig., 1957. [Romanian and Russian; French summary.]

This report [cf. **27**, p. 274] summarizes the weather conditions (a dry autumn in 1953 followed by a cold, wet winter; 1954–5 an excessively wet year) and gives details of diseases and physiological disorders of plants during the period.

On wheat *Puccinia triticea* [**33**, p. 410] was more widespread than in the previous years. Other cereal rusts were less severe. The wheat varieties most resistant to rusts were A-15 (winter) and Hordeiforme (spring). Of the spp. causing wheat bunt *Tilletia foetida* [**35**, p. 432] was the most frequent. Smut infection was heavier than usual on barley (*Ustilago hordei*, *U. nuda*, and *U. nigra* [**37**, p. 34]), oats (mostly *U.*

avenae [35, p. 490]), and maize (*U. zae* [*U. maydis*] and *Sorosporium holci-sorghii* [*Sphacelotheca reiliana*]). *Septoria nodorum* [map 283] on wheat was recorded for the first time in the country in 1954. A wilt of unknown origin occurred in nearly all the potato fields; some affected plants had symptoms of [tomato] stolbur virus and at the same time bore fructifications of *Colletotrichum atramentarium* [map 190]. Infection by *Phytophthora infestans* was widespread; *Erwinia phytophthora* [map 131] less severe. Beet mosaic virus and *Cercospora beticola* [map 96] were prevalent on sugar beet and *Fusarium lini* [map 32] on flax. *Corynebacterium michiganense* [map 26] on tomatoes was recorded for the first time in 1955. *Colletotrichum lindemuthianum* [map 177] and *Xanthomonas phaseoli* on beans [*Phaseolus vulgaris*] and *X. campestris* [map 136] on cabbage were severe, whereas *Phoma lingam* [map 73] on cabbage was less widespread, *Puccinia menthae* on mint caused up to 40–50% defoliation. *Podosphaera leucotricha* [map 118] increased rapidly on apples during the period under review, reducing the yield of Jonathan. *Mycosphaerella sentina* [map 325] on pears and *Diplocarpon soraueri* [*Fabraea maculata*] and *Monilinia lindhartiana* [*Sclerotinia padi*] on quince caused severe damage. *Gnomonia leptostyla* and *Microstroma juglandis* were frequent on walnuts. *Actinomyces totschidlow-schii* was associated with *Alternaria capsici-annui* on sweet pepper [*Capsicum* sp.]. *Pseudomonas mori* and *Cercospora pulvinulata* [*C. pulvinata*] caused considerable damage to mulberry. *Phyllosticta diospyri* on *Diospyros lotus* was controlled by Bordeaux mixture at 0.5–0.75%. Heavy infection was caused by *Sphaerotheca pannosa* on roses, *Fusarium dianthi* on carnations, and *Botrytis tulipae* on tulips.

Annual Report of the Department of Agriculture, Ghana, for the year 1955–56.—

37 pp., 3 pl., 1958. 3s. 6d.

In the section of this report [cf. 37, p. 6] dealing with plant pathology (p. 11) it is stated that the [bronze leaf wilt] disease of coconuts continued to spread to the east and west of Keta. Further attempts to isolate a pathogen and transmit the disease artificially were unsuccessful. Fertilizers and trace elements had no effect. No association was established between the disease and high salinity or depth of ground water, though less disease was present where the ground water level was affected by tidal influences.

The mealybug *Ferrisia virgata* is an inefficient vector of tristeza virus disease of limes [33, p. 151]. Among diseases found, not previously recorded in Ghana, were *Cercospora musae* [*Mycosphaerella musicola*: 35, pp. 419, 879] on banana and *Septoria lycopersici* [map 108] on tomato foliage.

The work reported on cacao swollen shoot virus disease (pp. 17–18) has already been noticed [cf. 37, pp. 150, 463], and also that on black pod [*Phytophthora palmivora*: loc. cit.] (p. 20).

Болести и неприятели, появили се по културните растения в България през 1956 год. [Diseases and pests of cultivated plants in Bulgaria in 1956.]—Бюл. Раст. Защ. (Bull. Plant Prot., Sofia), 6, 2 (10), pp. 7–100, 1957. [Received Apr. 1958.]

This report [cf. 37, p. 326] includes notes on the following of economic importance: beet yellows virus [map 261] on table beet, tobacco ring spot virus [map 144] on tobacco, tomato, and sweet pepper [*Capsicum*], yellows [unspecified] on sweet pepper, *Didymella applanata* on raspberry [map 72], and *Bacterium* [*Agrobacterium*] *tumefaciens* [map 137] on vine.

SHOEMAKER (R. A.) & CREELMAN (D. W.). **Thirty-seventh Annual Report of the Canadian Plant Disease Survey, 1957.**—xxii+132 pp., 1958.

In the section on new and noteworthy diseases (pp. iv–vi) [duplicated in French: cf. 37, p. 205] it is recorded that leaf rust of wheat [*Puccinia triticina*] was most conspicuous. In most Provinces wheat was affected by *Septoria* diseases. *Hel-*

minthosporium [*Pyrenophora*] *teres* was common on barley in western Canada, but *H. gramineum* was rare. Foot rot of wheat and barley was associated with *H. sorokinianum* [*Cochliobolus sativus*: **35**, p. 288]. New records included *H. triseptatum* [cf. **31**, p. 330] on *Holcus lanatus*, *Helminthosporium tuberosum* on *Secale cereale*, and *H. dictyoides* var. *phlei* on *Phleum pratense* [**34**, p. 651].

Agropyron streak mosaic virus was recorded for the first time on *A. repens* [cf. **33**, p. 285], *Triticum aestivum*, and *Agropyron* × *Triticum* hybrids.

Losses in the flax crop from aster yellows [virus] amounted to 10–15% [cf. **36**, p. 177].

Phytophthora root and stalk rot of soybean in S.W. Ontario [*P. ? megasperma*: **37**, p. 437] was the most severe for 3 yr., owing to heavy rainfall and the widespread use of the susceptible Harosoy. The new var. Chippewa was susceptible but Harman was tolerant. Yield reductions in badly affected fields were 18–25%.

Corynebacterium sepedonicum [**37**, p. 307] on potato increased in prevalence in parts of Quebec and Ontario, while *Pellicularia filamentosa* [*Corticium solani*] was unusually severe in British Columbia, Saskatoon, and Ontario.

The distribution of the prevalent potato purple top corresponded with that of aster yellows virus in other crops [**34**, pp. 54, 629]. Carrots, celery and lettuce were affected by this virus in Ontario.

The newly recorded presence of *Fusarium oxysporum* f. *pisi* race 2 on peas in Ontario was confirmed. Wisconsin pea stunt [str. of red clover vein mosaic] virus is also new to Canada and was observed in Manitoba. The agent of tomato anthracnose in Ontario was shown to be *Colletotrichum atramentarium* and not *C. phomoides* as previously supposed [cf. **37**, p. 206]. In Nova Scotia grey mould (*Botrytis cinerea*) [cf. **34**, p. 629] caused heavy losses in tomato crops, particularly those sprayed with dithiocarbamates. *Phytophthora infestans* on tomatoes [cf. **37**, p. 315] was the most prevalent for 10 yr.

Plum production in Nova Scotia was affected by *Dibotryon morbosum* [cf. **33**, p. 708]. Strawberry green petal [? aster yellows virus: **35**, pp. 619, 690] was found for the first time in Quebec and British Columbia.

YAMANE (G.) & KOMATSU (M.). **About the prohibitive action and the inhibiting power of streptomycin against *Bacterium solanacearum* Smith and *Bacillus phytophthorus* Appel, and about its streptomycin-resistance, considering the co-operative action of streptomycin and penicillin to them.**—*Sci. Rep. Kagoshima Univ.*, **6**, pp. 99–112, 4 pl., 2 graphs, 1957. [Japanese. Abs. from English summary.]

Bacterium [*Pseudomonas*] *solanacearum* inoculated on broad bean was inhibited by streptomycin at 500 µg./ml. and 1,000 µg./ml. Growth of *P. solanacearum* and *Bacillus phytophthorus* [*Erwinia phytophthora*] in culture was also inhibited by these concentrations. After 6 successive generations on media containing the antibiotic some resistant *E. phytophthora* remained viable, but were unable to survive when 10,000–30,000 units of penicillin were also added to the culture.

BREED (R. S.), MURRAY (E. G. D.), & SMITH (N. R.). **Bergey's Manual of Determinative Bacteriology.**—Seventh edition, pp. xviii+1094, London, Baillière, Tindall & Cox, 1957. £6.

Although the general presentation of this work appears to be unaltered [cf. **24**, p. 176] the increased amount of material has necessitated division into two volumes, the present *Manual*, which contains descriptions of the adequately described species, and the forthcoming *Index Bergeyana*, which will provide an index to all the literature of both accepted and poorly described organisms, together with many of the less important synonyms for the species included in the *Manual*, and a host and habitat index.

The latest *Manual* (in the preparation of which the three Editors had the assistance of 94 contributors) deals with 2 of the 3 classes of the Protophyta, the Schizomycetes and the Microtatiobites (the Schizophyceae (blue-green algae) being excluded) which comprise 12 Orders (of which the Virales—included in the 6th Edition—is excluded), 51 Families, 208 genera (58 monotypic), and 1,529 species. The two largest genera are *Pseudomonas* and *Streptomyces* with 149 and 150 spp., respectively. W. H. BURKHOLDER has again been responsible for most of the plant pathogenic bacteria.

V. B. D. SKERMAN has provided (pp. 987–1032) a comprehensive key to determine the generic position of organisms and there are keys to species under most of the genera.

[The nomenclature adopted in this *Manual* will be followed as closely as possible in this *Review*].

JAGTAP (AHILYA P.). **Studies in the entomogenous fungus, *Metarrhizium anisopliae* (Metsch.) Sorok.**—*Curr. Sci.*, **27**, 3, pp. 99–100, 1 fig., 1958.

The parasitism of *M. anisopliae* on *Pyrilla* sp. [cf. **32**, p. 378] at various stages of the insect's growth has been established under laboratory conditions, and the fungus cultured on a number of media. It grew over the ventral and dorsal surfaces of the abdomen, but the chitinous and horny parts were impervious.

SHANDS (W. A.), THOMPSON (C. G.), SIMPSON (G. W.), & WAVE (H. E.). **Preliminary studies of entomogenous fungi for the control of Potato-infesting aphids in Maine.**—*J. econ. Ent.*, **51**, 2, pp. 184–186, 1958.

In 1 of 4 tests in 1955, *Acrostalagmus* (?) *aphidium*, isolated from a collection of *Rhopalosiphum maidis* from Hawaii, was recovered from dead specimens of *Macrosiphum solanifolii* [*M. euphorbiae*] in Green Mountain potato plots 3 weeks after the lightly infested plants had been sprayed once with laboratory-cultured spores.

ROSEN (I.), DI SANZA (R. A.), & HIRSCH (A.). **Some new derivatives of pentachlorophenol and their fungistatic activities.**—*J. org. Chem.*, **23**, 1, pp. 149–150, 1958.

Of 8 esters, 2 ethers, and 6 salts of pentachlorophenol, mostly synthesized for the 1st time, tested at the Diamond Alkali Company, Painesville, Ohio, the amine salts, especially 8-hydroxyquinoline [**37**, p. 450], were the most active inhibitors of spore germination of *Alternaria oleracea* [*A. brassicicola*] and *Monilinia* [*Sclerotinia*] *fruticola*. All the compounds, however, like the parent substance, were phytotoxic.

BULIT (J.), LOUVET (J.), & TARIS (B.). **Étude du pouvoir fongicide de certains dérivés nitrés et chlorés du phénol et du crésol.** [A study of the fungicidal power of certain nitro and chloro derivatives of phenol and cresol.]—*Phytiatrie-Phytopharm.*, **6**, 4, pp. 197–208, 1957.

The authors describe experiments at the Station Centrale de Pathologie Végétale, Versailles, and at the Laboratoire de Botanique, Institut National Agronomique, Paris, in which 2 nitro derivatives of cresol, dinoseb [**36**, p. 434] (the composition of which (oily form) is 10% DNOC and 90% dephenolated tar oil rendered emulsifiable) and pure ammonium dinitro o-cresylate (DNOC NH_4); 2 nitro derivatives of phenol, a dinoseb product (consisting of 20% dinoseb, 8–10% polyalkylphenols, 8–10% nitrophenols, 4–5% emulsifier, and 55–60% oil as solvent) and the ammonium salt of dinoseb (DNBP NH_4) as a 12% alcoholic solution; and 2 cresol derivatives, dichloro (MP) cresoxy triethylene glycol (3 EG) and dichloro (MP) cresoxy pentaethylene glycol (5 EG) were tested for their fungicidal activity against *Dothichiza populea*, *Cytospora chrysosperma* [*Valsa sordida*], and *Fusarium avenaceum* from poplar, *Nectria galligena* from apple, *Botrytis cinerea* from lettuce, and

F. oxysporum from melon. The materials were compared *in vitro* with phenyl mercury chloride or nitrate and with copper sulphate. The products were tested at various concentrations quantitatively for their effect on mycelial development and qualitatively for their effect on spore germination. Phytotoxicity tests were also made on the hosts.

The results demonstrated that the nitro dyes, especially DNOC and DNBP, possess high fungicidal ability and may be used at 100–200 µg./ml., but they are appreciably phytotoxic at about 0.25% to apple during dormancy. The difference between the fungicidal and the phytotoxic concentrations enables them to be used *in vivo*. The fungicidal activity of the polyethylene glycols is low and they would have to be used at 2,000 µg./ml. or more; they were phytotoxic only at 0.5–1% or more.

Tolerances for residues of captan.—*Fed. Reg.* 23, p. 1808, 1958. [Abs. in *Chem. Abstr.*, 51, 10, col. 8412 b–e, 1958.]

A tolerance of 100 p.p.m. of captan is established under the United States Federal Food, Drug, and Cosmetic Act in respect of a large number of raw agricultural commodities [which are listed].

Official F.D.A. tolerances listed.—*Nat. agric. chem. Ass. News*, 16, 2, pp. 4–14, 1958.

This list of pesticide tolerances established by the Food and Drug Administration, U.S.A., up to 1 Mar. 1958 follows the customary lines [cf. 36, p. 655].

BARTON (LELA V.) & FINE (JEAN M.). **Noninterference between effects of gibberellic acid and fungicides.**—*Contr. Boyce Thompson Inst.*, 19, 3, pp. 291–294, 1958.

Greenhouse tests with tomato plants inoculated with *Alternaria solani* and sprayed with captan or maneb combined with gibberellic acid (GA) at 1–100 p.p.m. (—200 with captan) and beans (*Phaseolus vulgaris*) inoculated with *Pseudomonas* [*medicaginis* f.sp.] *phaseolicola* or *Uromyces phaseoli* [*U. appendiculatus*] and sprayed with agrimycin and a fungicide of unknown composition, respectively, together with GA at up to 100 p.p.m., indicated that GA can probably be used with fungicides and bactericides without interference in disease control or impairment of its own growth-promoting properties.

Slide tests with *A. oleracea* [*A. brassicicola*] and *Monilinia* [*Sclerotinia*] *fruticicola* showed 86–95% germination of *A. brassicicola* spores with GA up to 200 p.p.m., but none at 1,000 or 2,000 p.p.m. Spores of *S. fruticicola*, however, were unaffected at the highest conc. This indicates that some fungi may be controllable by GA alone, and a varying degree of such control was noted for *A. solani* on tomato plants.

The manufacture of diphenyl impregnated wrappers, cartons and liners.—*Tech. Serv. Bull.*, Monsanto Chem. Ltd., London, 6 pp., 1 fig., [? 1958.]

This bulletin, published to assist paper manufacturers and converters interested in producing diphenyl-impregnated paper for the citrus-fruit industry, contains sections on the properties of diphenyl, types of diphenyl-impregnated paper, the amount of diphenyl used, the method of impregnation, equipment, estimation of diphenyl present in paper and fruit, packaging of impregnated paper, and technical service available. Enclosed is a 20 pp. booklet, 'Some facts about diphenyl wrappers'.

MAGDOFF (BEATRICE S.), BURCHFIELD (H. P.), & SCHECHTMAN (JOAN). **Chemistry and crystallography of some polybasic cupric calcium sulphates (Bordeaux mixtures).**—*Contr. Boyce Thompson Inst.*, 19, 3, pp. 267–288, 1 fig., 8 graphs, 1958.

This paper describes investigations into the composition and properties of the

hydrogel and of 4 chemical compounds formed when 1–3 38 moles of lime are mixed with 1 mole of Cu SO_4 (10–3–100 to 10–10–100 Bordeaux mixture) at the concentrations normally used in fungicidal sprays.

MORENO (A. A.). **Farmacopea agricola : Formulario contra plagas y enfermedades de las plantas.** [Agricultural pharmacopoeia: a formulary for pests and diseases of plants.]—*Manuales téc.*, Ser. G, 20, pp. xiv+289, 49 fig., 1 diag., 1958.

Much of this book is devoted to the control of insect pests. Of mycological interest are the practical notes (pp. 181–228) on the preparation, characteristics, and use of Cu, S, mercurials, compounds of Fe, Zn, and other metals, and non-metallic organic compounds as fungicides, and on insecticide-fungicide mixtures. In conclusion the chemicals are listed (pp. 269–275) with the names of the proprietary products incorporating them.

ENGHUSEN (H.). **Näheres über Fungizide und Insektizide.** [Particulars regarding fungicides and insecticides.]—*Seifen-Öle*, 83, 26, pp. 793–797, 12 fig., 1957.

In the 1st part of this survey of the chemotherapeutic control of plant diseases the author describes the chemistry of the active substances, their technology and therapeutic applications, mode of action, and toxicity to man and domestic animals under the main headings: traditional inorganic fungicides, old-established organic fungicides, new organic fungicides, systemic fungicides, antibiotics, and organic-synthetic insecticides.

JOHNSON (F. R.) & HILLIS (A. M.). **A fluorescent mineral tracer technique to determine fungicide placement in the soil profile.**—*Plant Dis. Repr.*, 42, 3, p. 287, 1958.

Olin Mathieson Chemical Corporation report investigations on the use of tracer materials, other than radioactive, for adding to soil fungicides to estimate their placement. Zinc orthosilicate (willemite), which is relatively inexpensive and highly fluorescent in ultra-violet light at 50–100 p.p.m., fluoresces sufficiently under some soil conditions for a cross-section of the soil profile to be photographed. Synthetic willemite at 40% in a fungicide dust was applied to the seed furrow at 10 lb./acre, and various furrow attachments were used to determine their capacity for placing the fungicide to control damping off of cotton seedlings [cause unspecified].

WARD (C. B.). **Fungicidal effect of the triethylene glycol vapor on spores of *Penicillium notatum*.**—Abs. in *Iowa St. Coll. J. Sci.*, 32, 2, pp. 282–283, 1957.

About 87% of airborne spores of *P. notatum* exposed to triethylene glycol (TEG) vapour for 8 min. failed to germinate after 14 hr., and in most tests 100% of those exposed for 23 min. failed to germinate after 5 days. TEG was ineffective at humidities below $\frac{2}{3}$ saturation, while at $\frac{3}{4}$ saturation it was as effective as at saturation or supersaturation.

HICKMAN (C. J.). **Phytophthora—plant destroyer.**—*Trans. Brit. mycol. Soc.*, 41, 1, pp. 1–13, 1958. [112 refs.]

This presidential address comprises a general consideration of the genus under the headings distribution and host range, survival, dispersal, and physiologic specialization.

STANIER (Y.), DOUDOROFF (M.), & ADELBERG (E. A.). **General microbiology.**—xxii+682 pp., 224 fig., London, Macmillan & Co. Ltd., 1958. 50s.

This very useful treatise contains much information of interest to mycologists and plant pathologists in connexion with the life-histories and other aspects of fungi, bacteria, and viruses and the diseases which they cause. Part 1 is concerned with

the properties of micro-organisms, 2 with their ecology, and 3 with the biological background. Chapter 2 (pp. 26–52) deals with the development of microbiological methods; 5 (pp. 77–98) with fungi (as members of the group of higher protists); and 29 (pp. 567–573) with bacterial diseases of plants and their control; while many relevant items are scattered through other sections of more general aspect.

STEEL (R.) (Editor). **Biochemical engineering: unit processes in fermentation.**—328 pp., 39 fig., 20 graphs, London, Heywood & Co. Ltd., 1958. 50s.

This book, the first of its kind, presents in expanded form a course of 10 post-graduate lectures delivered at the Manchester College of Science and Technology in 1957. The papers are 'Introduction: the principles of biochemical engineering' (H. Hartley); 'The scope of biochemical engineering' (F. E. Warner); 'Micro-organisms and their activities' (D. J. D. Hockenfull); 'Substrates for fermentation processes' (R. Steel); 'Sterilization of equipment, air, and media' (A. Parker); 'Development of anaerobic fermentation processes: acetone-butanol' (R. Ryden); 'Oxygen supply and demand in aerobic fermentation' (B. H. Arnold and R. Steel); 'Development of aerobic fermentation processes: penicillin' (I. Jackson); 'Equipment design' (J. A. H. Walker & H. Holdsworth); 'Recovery of fermentation products' (W. K. Anslow); and 'Present trends and future developments' (J. J. H. Hastings).

Pests and diseases of foodstuffs in store. Europe and Mediterranean, 1955–1957.—30+xxii+17 pp., European and Mediterranean Plant Protection Organisation, Paris, 1958. [French and English texts.]

In the section on fungal diseases in this publication [cf. **35**, p. 880] (pp. 22–25 of the French text and xx–xxii of the English) it is stated that in the Constantine area of Algeria 1,000 tons (tonnes) of stored potatoes became unmarketable as a result of infection by *Phytophthora infestans* and *Fusarium solani*. In Belgium 5–10% (about 35,000 tons (tonnes)) of home-produced wheat intended for milling was affected by fungi in 1955. In Poland spp. of *Mucor*, *Rhizopus*, *Penicillium*, *Aspergillus*, *Fusarium*, *Trichothecium*, and *Cladosporium* are commonly present on stored grain, especially if the humidity at the time of storage exceeds 16%.

RANGASWAMI (G.). **Isolation, characterisation and properties of mycothricin and mycothricin A, two new basic antibiotics.**—*Diss. Abstr.*, **17**, 10, p. 2121, 1957.

During studies at Rutgers University, New Jersey, strains 3716 and 3717 of the *Streptomyces lavendulae* group isolated from soil were found to produce the antifungal and antibacterial substances mycothricin [**36**, p. 487] and mycothricin A [**36**, p. 203], respectively. Both are complex polypeptides of 5 ninhydrin positive components. Mycothricin is more antifungal, more thermostable, and less toxic than mycothricin A, both are more toxic than streptothricin. Mycothricin is absorbed by tomato and cucumber plants via cut ends of shoots and roots.

ABO-EL-DAHAB (M. K.). **Effects of certain antibiotics on representative phytopathogenic bacteria with special reference to *Pseudomonas solanacearum*.**—*Diss. Abstr.*, **17**, 11, p. 2391–2392, 1957.

The reactions of 34 species and strains of phytopathogenic bacteria to 10 antibiotics (oxytetracycline, penicillin G, streptomycin, neomycin, tetracycline, chlorotetracycline, bacitracin, carbomycin, erythromycin, and chloramphenicol) were uniform within each species or genus but given species or strains varied in their response to different antibiotics.

All the bacteria tested were inhibited by chlorotetracycline, tetracycline, erythromycin, and oxytetracycline, except *Agrobacterium* which tolerated fairly high concentrations of the last.

Gram+species of *Corynebacterium* were the only ones affected by penicillin G. Strains of *Pseudomonas* were the most sensitive to streptomycin [37, p. 185] and *A. tumefaciens* was very tolerant of it.

Pseudomonas spp. were the most tolerant of neomycin. *P. solanacearum* strains varied in their response to chloramphenicol; highly resistant mutants, obtained by serial culture in increasing concentrations, were resistant to oxytetracycline and chlorotetracycline, suggesting a similar mode of action for these 3 antibiotics. The pathogenicity of *P. solanacearum* was not related to the antibiotic resistance. Strains resistant to chloramphenicol required organic N whereas sensitive strains grew well with NH_4Cl as the N source. Resistant mutants of tobacco isolates required serine or alanine but those from tomato were able to utilize proline, glutamine, or asparagine. Pathogenic strains of *P. solanacearum* had a lower rate of O uptake than non-pathogenic ones, and reduced tetrazolium chloride more rapidly under anaerobic conditions, and less rapidly under aerobic conditions.

WRIGHT (E.) & TARRANT (R. F.). **Occurrence of mycorrhizae after logging and slash burning in the Douglas-fir forest type.**—*Res. Note Pacif. Northwest For. Exp. Sta.* 160, 7 pp., 4 graphs, 1958.

The amount of ectotrophic mycorrhiza on Douglas fir [*Pseudotsuga menziesii*] seedlings 1 and 2 yr. after burning was not related to the severity of burning but there were fewer mycorrhizal seedlings in burned than unburned areas [cf. 37, p. 523].

NOUR (M. A.). **Studies on *Leveillula taurica* (Lév.) Arn. and other powdery mildews.**—*Trans. Brit. mycol. Soc.*, 41, 1, pp. 17–38, 4 graphs, 1958.

At the Faculty of Agriculture, Shambat, University of Khartoum, Sudan, conidia of *L. taurica* [cf. 36, p. 566; 37, p. 400] from mildewed specimens of the ubiquitous weed *Euphorbia heterophylla* and from broad bean produced infection in several cultivars of Egyptian and American cotton (*Gossypium barbadense* and *G. hirsutum*), and cross-inoculations with conidia from cotton were equally successful. Conidia from *Abutilon figarianum*, however, were consistently smaller and failed to produce infection in any other host tested; it is concluded that they represent a different variety or even a different species.

In parallel experiments with *Erysiphe graminis* on young barley at Rothamsted and *L. taurica* on *Euphorbia heterophylla* at Shambat washing failed to dislodge conidia placed or dusted on the plants 3 hr. or more previously. This points to adhesion prior to penetration, which with these spp. does not normally occur until 24–48 hr. after inoculation. With these host-parasite combinations the mildew rating was unaffected by maintaining the plants at 100% R.H. after inoculation. Fresh conidia of *L. taurica* germinated best at R.H. 85–100%; those submerged in water germinated poorly; floating conidia did better. Conidia of *E. graminis* behaved similarly but were more sensitive to humidity below 95%, as were those of *E. cichoracearum*, *E. umbelliferarum*, and *Sphaerotheca fuliginea*, tested in the Sudan.

COUEY (H. M.). **Germination and germ tube development of *Puccinia coronata* uredospores.**—*Abs. in Iowa St. Coll. J. Sci.*, 32, 2, pp. 153–154, 1957.

A further study of the role of Zn and gelatin in uredospore germination in *P. coronata* [32, p. 477] showed that increasing the conc. of gelatin increased the Zn requirement for opt. vesicle formation and inhibition of germination; water extraction of the gelatin decreased it. On deionized gelatin the opt. pH for germination was 7–9, on whole gelatin, 5–9. Ca and Mg antagonized Zn toxicity. Max. vesicle formation on deionized gelatin required 12×10^{-5} M Zn and 10^{-4} M Ca or Mg at pH 8; on whole gelatin, $12\text{--}16 \times 10^{-5}$ M Zn at 7–9. Vesicle formation was also obtained on Zn-amino acid solutions at pH 8.

MATUO (T.) & SAKURAI (Y.). **Effect of vitamins on the growth of *Fusarium lateritium* (Nees) S. et H., *Diaporthe nomurai* Hara and *Rosellinia necatrix* (Hart.) Berl.—Res. Rep. Fac. Text. Seric. Shinshu Univ. 5, pp. 8–12, 2 graphs, 1955.**
[Japanese. Abs. from English summary. Received Apr. 1958.]

In cultural studies *F. lateritium* [*Gibberella lateritia*] was able to synthesize thiamine, biotin, inositol, and pyridoxine. *D. nomurai* was thiamine-deficient, and *R. necatrix* deficient for both thiamine and biotin.

KERR (A.). **The use of cellophane in growth studies on soil fungi.**—*Trans. Brit. mycol. Soc.*, **41**, 1, pp. 14–16, 1958.

At the Waite Agricultural Research Institute, Adelaide, S. Australia, a cellophane bag technique [36, p. 112] was used to study the growth of *Pellicularia* [*Corticium*] *pratensis* [36, p. 129]. Inoculum was inserted between 2 cellophane disks 12 cm. diam., the edges sealed, and development of the colony compared when the bags were placed in different substrata. Growth in washed sterilized sand, representing the capacity to grow from the water agar inoculum plug with little or no influence of nutrients or antibiotics, was extensive though sparse. Growth in sterilized soil was, unexpectedly, only slightly greater than in unsterilized, but this was shown to be an artificial effect, probably due to the impermeability of the cellophane to certain nutrients or to fungal enzymes. Fresh grass cuttings stimulated the fungus to dense, extensive growth for 4 days, after which growth ceased and the hyphal tips swelled and burst. This may have been due to the antagonistic action of the micro-organisms, which developed abundantly on the outside of the disks.

MARTIN (J. P.) & PRATT (P. F.). **Fumigants, fungicides, and the soil.**—*J. agric. Ed Chem.*, **6**, 5, pp. 345–348, 3 fig., 1958.

In this paper, the 1st of 3 on 'What pesticides do to soils', the authors discuss the following aspects of the subject: influence on soil population, qualitative effects and their significance, soil chemical properties, soluble micronutrient elements, ammonium and nitrate nitrogen, and fumigant and fungicide residues. It is concluded that the fairly marked chemical and biological changes induced in the soil by such treatments do not as a rule significantly influence plant growth. The alterations are only temporary, persisting for variable periods from a few days to several years, depending on numerous factors.

KNÖSEL (D.). **Über die Wirkung aus Pflanzenresten freiwerdender, phenolischer Substanzen auf Mikroorganismen des Bodens. I. Der Einfluß von *p*-Oxybenzoesäure auf die Entwicklung von Pilzen, Actinomyceten und Bakterien.** [On the action of phenolic substances liberated by plant residues on soil micro-organisms. I. The influence of *p*-oxybenzoic acid on the development of fungi, actinomycetes, and bacteria.]—*Z. PflErnähr. Düng.*, **80** (125), 3, pp. 225–237, 1 fig., 1 graph, 1958.

The organisms used in these studies at the Institut für Pflanzenschutz der landwirtschaftlichen Hochschule, Stuttgart-Hohenheim, Germany, were isolated from samples of sand, clay, and compost as well as from the rhizospheres of flax, rye, and *Matricaria maritima*. Most of the fungi, namely *Mucor racemosus*, *Phoma betae*, *Fusarium solani*, *Penicillium affine*, *Aspergillus terreus*, and *A. niger*, were stimulated by the addition of *p*-oxybenzoic acid at 10^{-2} g./ml. to the biomalt solution (pH 5.8), the average increase in mycelial weight of the 6 species being 37%.

In general, actinomycetes (on Conn's solution at pH 7.5) were considerably more sensitive, their growth being almost entirely inhibited at 10^{-2} , while 40% of the strains failed to develop at 10^{-4} .

The response of the bacteria on potato agar (pH 7.2) was less uniform than those of the foregoing groups. Among the more important species, *Erwinia phytophthora* was scarcely influenced by the chemical.

In a series of tests on soil samples, *p*-oxybenzoic acid caused a relative regression of actinomycetes and bacteria but did not affect the fungal population.

TOLLE (ROSEL) & RIPPEL-BALDES (A.). **Untersuchungen über die Rhizosphäre von Gramineen.** [Studies on the rhizosphere of Gramineae.]—*Zbl. Bakt.*, Abt. 2, 111, 6-7, pp. 204-217, 2 fig., 1958.

At the Institut für Mikrobiologie, University of Göttingen, Germany, 40 species of fungi were isolated with varying frequency from the rhizospheres of oats, wheat, rye, and barley. The ratio of the number of species in the rhizosphere to that in the soil fluctuated between 1.4 and 3.

In general, when spores of the isolates, including *Rhizopus nigricans* [*R. stolonifer*] and species of *Mucor*, *Zygorrhynchus*, *Pythium*, *Aspergillus*, *Penicillium*, *Fusarium*, and *Cladosporium*, *Cunninghamella elegans*, and *Trichoderma lignorum*, were brought into contact with cereal roots, they germinated and produced mycelium in the immediate rhizosphere only.

The specificity of the cereal rhizosphere fungi was demonstrated by their failure to develop in the rhizospheres of plants from other families, while conversely organisms from the latter made no growth near cereal roots.

Culture filtrates (undiluted and/or at 1:10) of the isolates from barley rhizospheres exerted a powerful inhibitory effect on wheat root growth, but at 1:100 were stimulatory, reaching a peak at 1:1,000 and beginning to decline again at 1:10,000. Filtrates from 4 strains of *Penicillium* were only slightly stimulatory at 1:1,000 while causing marked retardation of root growth at the other dilutions. Hence it is postulated that the culture filtrate contains both inhibitory and activating, thermostable substances overlapping in their operation.

MALOY (O. C.) & ALEXANDER (M.). **The 'most probable number' method for estimating populations of plant pathogenic organisms in the soil.**—*Phytopathology*, 48, 3, pp. 126-128, 1958.

This method, described from Cornell University, involves the application to soil fungi of a technique, already used for bacteria, for the calculation by reference to a Most Probable Number table of the number of organisms present from the number of tubes in which growth occurs in a graduated series of dilutions.

Spore suspensions of *Fusarium solani* f. *phaseoli* were tested by inoculation on Red Kidney bean plants (*Phaseolus vulgaris*) and those of *Thielaviopsis basicola* on carrot disks [25, p. 487], the dilution being made either with soil or, more conveniently, with water. A min. 6-week incubation period was found desirable before examination of the host material. When sterile soil inoculated with *T. basicola* was mixed with field soil competition with the normal soil microflora did not appear to interfere with estimation of the pathogen even if present in low numbers.

Estimations made by this method and by plate counts of the spore suspensions used to infest the soil were in good agreement though there was a tendency for the former to be somewhat lower.

WRIGHT (E.) & TARRANT (R. F.). **Microbiological soil properties after logging and slash burning.**—*Res. Note Pacif. Northwest For. Exp. Sta.* 157, 5 pp., 1957.

In severely burned forest soils in the Douglas fir [*Pseudotsuga menziesii*] region near Corvallis, Oregon, the pH and the numbers of bacteria and actinomycetes were increased in the surface soil and the ratio of actinomycetes to bacteria lowered as compared to that in unburned soils [cf. 37, p. 520].

PETERSON (N. K.). **Molybdenum as a trace element in soils and plants.**—*Diss. Abstr.*, **17**, 10, p. 2144, 1957.

Work at Rutgers University, New Jersey, on the Mo content of crop plants and soils in relation to deficiencies showed that the boll symptoms of Mo deficiency on cotton were similar to those produced under acid soil conditions, i.e., 'hard boll'. Application of Mo had no effect on the lucerne crop, while at pH 5.5 it increased yield of sweet potatoes, this pH being opt. for uptake and utilization of Mo and N if the latter was added simultaneously. At this pH Mo deficiency symptoms were also noted on maize and soybeans.

MEIKLEJOHN (JANE). **Numbers of bacteria and actinomycetes in a Kenya soil.**—*J. Soil Sci.*, **8**, 2, pp. 240–247, 1 graph, 1957.

The computation of numbers of micro-organisms derived from plate counts from surface soil samples taken at Muguga, Kenya, between Nov. 1952 and May 1953 was affected by the dilution, low and high dilutions giving small and large estimates, respectively. A dilution of 1:1,000,000 was therefore used for comparative purposes and Thornton's mannitol-asparagine agar (*Ann. appl. Biol.*, **9**, p. 241, 1922) was selected as the standard medium. The ratio between direct and plate counts was wide at first, ranging from 39 to 81, but it narrowed (to 4 in 1 sample) as the drought of early 1953 became prolonged. The initial percentage of [unspecified] actinomycetes was less than 30 but rose to over 90 when the drought was well established.

SAWADA (K.). **Researches on fungi in the Tohoku District of Japan. (IV). Fungi Imperfecti.**—*Bull. For. Exp. Sta., Meguro* 105, pp. 35–140, 1958. [Japanese and English.]

This annotated list [cf. **32**, p. 401] of 293 fungi contains many new species, including *Ascochyta brassicae-campestris* on Chinese cabbage leaves, *A. rheicola* on rhubarb leaves, *Stagonospora cucurbitae* on vegetable marrows, *Coryneum rosae* on *Rosa multiflora* leaves, *Ovularia castaneae* on chestnut (*Castanea crenata*) leaves, *Cladosporium phlei-pratense* on *Phleum pratense* leaves, *Heterosporium dianthi* on *Dianthus superbus* var. *longicalyx* leaves, *Alternaria phaseoli-vulgaris* on *Phaseolus vulgaris* pods, *A. primulae* on *Primula obconica* leaves, and *Epicoccum phaseoli* on *Phaseolus radiatus* var. *aureus* leaves.

OSIPYAN (L. L.). Материалы к изучению рода *Cercospora* в Армянской ССР. [Data from the study of the genus *Cercospora* in the Armenian S.S.R.]—*Bull. Biol. Agric. Sci., Acad. Sci. Armen. S.S.R.*, **10**, 9, pp. 35–46, 1957. [Armenian summary.]

In this detailed study with the assistance of the Erevan University, Armenia, 36 species are described, of which 26 are first records for the republic, on 20 hosts, mainly trees and shrubs in the damp parts of N. Armenia. The dominant plant pathogens are *C. microspora* on lime trees (*Tilia cordata*), *C. cornicola* on the leaves of *Svida* [*Cornus*] *australis*, and *Cercospora beticola* on table beet. Dogwood (*Cornus mas*) even in direct contact with infected *C. australis* leaves failed to become infected by *Cercospora cornicola*.

GOLOVIN (P. N.). Вид как сложная систематическая группа у грибов. [The species as a complex taxonomic unit in the fungi.]—Вестн. Ленинград. Унив. [Vestn. Leningrad Univ.], Ser. Biol. 2, 1958, 9, pp. 14–24, 1958. [English summary.]

The author discusses the concept of species in fungi, dealing first with rusts, mainly *Puccinia graminis* and *P. triticina* and their form species, and then with Erysiphaceae, in which, he points out, the primitive genera *Erysiphe* and *Sphaerotheca* have

the highest number of complex forms. He reviews the work on other genera to substantiate his theory that it is best to consider the species as a complex taxonomic unit consisting of smaller categories evidently related to each other, in preference to a series of 'small' species distinguishable by only small ill-defined morphological differences.

DALE (J. L.). **Two rusts previously unreported from Arkansas.**—*Plant Dis. Repr.*, **42**, 3, p. 402, 1958.

The rusts are fig rust (*Physopella* [*Cerotelium*] *fici*) and maize rust (*Puccinia polysora*) [map 237].

KARLING (J. S.). **New and unidentified species of *Synchytrium*. V.**—*Mycologia*, **49**, 5, pp. 740–755, 5 fig., 1957.

In this further contribution [cf. **36**, p. 731] 3 new species of *Synchytrium* are described from American herbarium material. In addition, notes are given on 8 as yet unnamed species on new hosts.

SIERRA (G.). **A simple method for the detection of lipolytic activity of micro-organisms and some observations on the influence of the contact between cells and fatty substrates.**—*Lewenhoek J. Microbiol. Serol.* (formerly *Leeuwenhoek ned. Tijdschr.*), **23**, 1, pp. 15–22, 3 fig., 1957.

In the method here described from the Dept of Biochemistry, Institute 'Jaime Ferran' of Microbiology, Madrid, the formation of lipase by bacteria was demonstrated by the use of a peptone agar medium containing tween S (water soluble high fatty acid esters of a polyoxyalkylene derivative of sorbitan). Lipolytic activity was clearly revealed by the development of a halo round the colony.

FLETCHER (R. I.). **An improved Petri dish cover.**—*Proc. Ind. Acad. Sci.*, **66** (1956), pp. 57–59, 2 fig., 1957.

This cover, which controls the condensate from hot media, is used at De Pauw University, Greencastle, Indiana. It is made of fracture-resistant glass, the under surface sloping downwards from the edge towards the centre, where a glass stud holds an absorbent disk of specially prepared paper which by the time the medium has solidified has absorbed most of the condensate. The cover is obtainable from the A. S. Aloe Scientific Company, St. Louis, Missouri.

ALESHINA (Mme O.). **Совещание по вирусным болезням растений.** [Conference on virus diseases of plants.]—Вест. с.х. Наук. [*J. Agric. Sci., Moscow*], **3**, 4, pp. 158–159, 1958.

The all-Union conference on plant virus diseases, held on 11–15 Feb. 1958 at the V. I. Lenin Agricultural Academy, Moscow, U.S.S.R., included 38 detailed reports. V. L. RIZHKOV, in his address on the success of the phylogenetic systematics of viruses, remarked on the necessity of conforming to international rules. K. S. SUKHOV, on the genetical problems of virology, considered that the development and hereditary properties of a virus are determined by the nucleic acid component, the protein possessing only protective activity. M. S. DUNIN spoke on plant immunity, listing resistant varieties of beet, cotton, and [unspecified] beans, and in a second paper dealt with serological methods.

Reports were contributed on virus diseases in Georgia by Mme E. M. ERISTAVI, in Latvia by L. P. PETERSON, and in China by M. V. GORLENKO. Research on viroses of different crops was described by other members of the various scientific organizations taking part. Recommendations were given for the control of diseases of cereals, cotton, potatoes, vegetables, and fruit, the inadequacy of research on some agricultural crops and ornamentals in the U.S.S.R. being noted.

KOCHMAN (J.) & STACHYRA (T.). **Beiträge zur Kenntnis der pflanzlichen Viruskrankheiten und virusverdächtigen Erscheinungen in Polen.** [Contributions to the knowledge of plant virus diseases and symptoms suggestive of virus infection in Poland.]—*NachrBl. dtsh. PflSchDienst, Berl.*, N.F., **12**, 3, pp. 41–50, 2 fig., 1958. [English and Russian summaries.]

In this annotated list of 106 viroses of 86 plants, most of them cultivated, from the Institut für Pflanzenschutz, Pulawy, Poland, several are reported for the first time [cf. **37**, p. 340], including mosaic of medicinal rhubarb (*Rheum palmatum* var. *tunguticum*) and necrosis of *Datura innoxia*. The viruses concerned in these diseases have not yet been identified.

MARAMOROSCH (K.). **Viruses that infect and multiply in both plants and insects.**—*Trans. N.Y. Acad. Sci.*, Ser. II, **20**, 5, pp. 383–393, 1 fig., 1958.

The bibliography of this up-to-date survey comprises 40 papers, including 10 by the author.

BAWDEN (F. C.). **The nature of plant viruses.**—*Outlook on Agric.*, **1**, 6, pp. 244–251, 1 col. pl., 3 fig., 1957.

The author discusses the subject under the main headings: viruses as nucleoproteins; the morphology of virus particles; virus multiplication; and conclusion. Knowledge of the constitution of viruses suggests that substances most likely to interfere with their multiplication are those affecting the synthesis of nucleic acid [cf. **37**, p. 460].

Symposium on bacterial and viral genetics.—*Aust. J. Sci.*, **20**, 3, pp. 71–76, 1957.

At this symposium, organized by the Dept of Microbiology, Australian National University, and held at the John Curtin School of Medical Research, [Adelaide], Aug. 1957, R. J. BEST read a paper on the exchange of character determinants between strains of plant viruses. Over the years a number of naturally occurring strains of tomato spotted wilt virus [**36**, p. 429] have been isolated and characterized. When 2 strains (A and E) were inoculated simultaneously onto the same tomato, *Nicotiana glutinosa*, and tobacco plants, a number of new strains, as well as the originally introduced strains A and E, were recovered from the plants given the mixed infection.

Two of the new strains (New B and Etch) differ from the originals, but combine some of the characters of each. Both were isolated from a number of different plants in one experiment and again in a similar experiment a few months later. 'New B' was obtained from tomato plants with mixed infection and from the systemically invaded tops of *N. glutinosa*, a host which only one of the parents (E) invades systemically.

The frequency with which the new strains occur on plants with mixed infection in any one experiment and the fact that they appear whenever the experiment is repeated make it unlikely that they are mutants.

LOEFFLER (W.). **Abwehr-Reaktionen bei Pflanzenkrankheiten.** [Defence reactions in plant diseases.]—*Umschau*, **58**, 8, pp. 233–236, 10 fig., 1958. [7 refs.]

The subject is discussed and illustrated by reference to some well-known diseases.

MORENO (J. D.). **Observaciones sobre la incidencia de Monilia del Cacao en Ecuador.** [Observations on the incidence of *Monilia* on Cacao in Ecuador.]—*Turrialba*, **7**, 4, pp. 95–99, 1 fig., 1957. [English summary.]

Most of the information in this account of *Monilia royeri* on cacao has already been noticed [**36**, p. 233]. Inoculation of pods at different ages at the Estación Experi-

mental Tropical, Pichilingue, in 1956 showed that the fungus may act as a wound parasite entering either the peduncles or the sides of the pods [37, p. 221].

HAMPTON (R. O.). **Host specialization in *Pythium graminicolum* and pathogenicity of *P. graminicolum* to four host species in soil amended with nitrogen and phosphorus.**—Abs. in *Iowa, St. Coll. J. Sci.*, **32**, 2, pp. 184–185, 1957.

Six isolates of *P. graminicola* from the roots of cereals (maize, *Setaria*, wheat, barley, and rye) grown in continuously cropped or rotation-cropped soils were placed individually in pots of soil in which 8 seedling generations of 3 vars. of each host crop (plus oats, from which the fungus was not isolated in the field) were then raised. The fungus was isolated from the roots of each crop following the 8th generation. The resultant 18 isolates were then examined for host specialization, a degree of which was demonstrated. The virulence of variety isolates was not significantly influenced by the level of resistance of the crop varieties to which they were exposed.

Responses to both N and P were in general of lower magnitude in *Pythium*-infested soil than in control soil. Oats and barley (both resistant) gave a better response to both elements than did the susceptible maize and wheat.

The frequency of recovery of *P. graminicola* from the roots of field-grown maize was at a max. in early June (37.5%) and was high in early Sept. (15.8%). The fungus was not present in the roots of plants under 14 or over 132 days old. It was recovered predominantly from young vigorous roots, nearly healthy in appearance, and was present on 3 occasions in crown internode tissue.

TODOROVA (Мме V.). Загнивание на основата и корените при житните растения [Foot rot and root rot of Cereals.]—Бюл. Раст. Защ. (*Bull. Plant Prot.*, Sofia), **6**, 4 (12), pp. 15–28, 4 fig., 1957. [Russian and English summaries.]

At Chelopech, Pirdop area, Bulgaria, investigations in 1955 on wheat, barley, and rye infected by eye spot (*Cercospora herpotrichoides* [35, p. 623]), which causes severe losses in yield, showed all winter wheat vars. to be highly susceptible, rye and barley to be less affected, and oats resistant. Perithecia of *Leptosphaeria herpotrichoides* [cf. 26, p. 439; 34, p. 778] were also found on cereals affected by *C. herpotrichoides*, but pathogenicity was not proved. In 1956 *Wojnowicia graminis* [cf. 31, p. 58] was first recorded in Bulgaria. Injuries resembling root rot caused by *Ophiobolus graminis* [map 334] were observed but in the absence of perithecia the causal organism could not be determined with certainty. *Gibellina cerealis* [cf. 35, p. 872] was shown to cause foot rot; root rot of young plants was also attributed to *Helminthosporium sativum* [*Cochliobolus sativus*: map 322], *Rhizoctonia* [*Corticium*] *solani*, *Fusarium culmorum*, *F. nivale* [*Calonectria nivalis*], and *Pythium* spp.

MACHACEK (J. E.). **Co-operative seed treatment trials—1957.**—*Plant Dis. Repr.*, **42**, 4, pp. 529–533, 1958.

In this annual review [cf. 37, p. 29] the results of trials with 3 standard and 16 new seed dressings against wheat bunt (*Tilletia foetida* and *T. caries*), loose and covered smut of oats (*Ustilago avenae* and *U. kollerii* [*U. hordei*]), covered smut of barley (*U. hordei*), and [unspecified] seed rot of flax resulting from threshing injury are presented in the usual manner.

CHEREWICK (W. J.) & ROBINSON (A. G.). **A rot of smutted inflorescences of cereals by *Fusarium poae* in association with the mite *Siteroptes graminum*.**—*Phytopathology*, **48**, 4, pp. 232–234, 1 fig., 1958.

Investigations by the Canada Dept Agric. and the University of Manitoba, Winnipeg, showed *S. graminum* to occur plentifully in association with *F. poae* [cf.

36, p. 732] in smutted cereal inflorescences in the greenhouse (first noted in 1956 in barley infected by *Ustilago hordei* and *U. nigra*) and in the field (wheat, oats, and barley) in damp summer weather. Together the mite and the *Fusarium* induced a rot of the inflorescences; the mites feed on and serve as a vector for the fungus and cause injury that provides infection courts. Spraying weekly with 0.05% endrin after the 4th–5th leaf stage controlled the mites in the greenhouse.

SMITH (S. T.) & TOMS (W. J.). **Manganese deficiency in the cereal-growing areas.**—*J. Agric. W. Aust.*, Ser. 3, **7**, 1, pp. 65–70, 4 fig. (2 col.), 1 map, 1958.

In the cereal-growing areas of Western Australia [cf. **19**, p. 651] the crops affected by Mn deficiency are mainly wheat, oats, and barley, oats being the most susceptible and rye very resistant. Symptoms and control by soil dressings of manganese sulphate and foliage sprays with Mn solutions are described. Soil dressings should be used in severely affected areas before seeding, but spraying is useful when the presence of the deficiency is unknown at seeding or the affected patches are small and widely scattered.

HÄNSEL (H.). **Cereal breeding in Austria.**—*Euphytica*, **7**, 1, pp. 59–82, 1 map, 1958. [Dutch summary.]

The author reports from the Probstdorfer Saatzucht, Probstdorf, N.Ö., Vienna, on the breeding, distribution, productivity, performance (especially in relation to diseases), and seed sale of the chief varieties of wheat, rye, barley, and oats grown in Austria. The breeding objectives are, first, yield and quality, then resistance to frost and drought combined with earliness in the most continental of the 4 local climatic zones and with resistance to stem rust [*Puccinia graminis*], loose smut [*Ustilago avenae*], and mildew [*Erysiphe graminis*] in the 3 zones with the higher precipitations.

VAGER (R. M.). Получение специфической сыворотки к вирусу мозаики озимой Пшеницы. [Obtaining specific serum for the mosaic virus on winter Wheat.]—*Proc. Lenin Acad. agric. Sci.*, **22**, 12, pp. 20–21, 1957.

At the Moscow Station for Plant Protection, U.S.S.R., an antigen obtained by Suhov's method was used for the identification of wheat yellow [winter wheat] mosaic virus [**34**, p. 277] on wheat. Separate leaves were pulverized in 0.1% Na_2CO_3 , the sap was acidified with 0.1 N HCl to pH 4.5 until a white precipitate formed at 4–6° C., and then inoculated into rabbits (2.5–6 mg.) every other day for 2 weeks (total 69.6 mg.). From blood collected on the 8th day after the last inoculation a positive reaction was obtained; 1:160 dilution of the sap reacted very weakly and 1:80 gave the best results.

Svenno, ein neuer Sommerweizen im Richtsortiment. [The grading of Svenno, a new spring Wheat.]—*Mitt. schweiz. Land.*, **5**, 5, pp. 95–96, 1957.

In variety trials (1953–56) at the Versuchsanstalt Zürich-Oerlikon, Switzerland, the Swedish wheat var. Svenno was similar to Huron and Lichti in its reaction to mildew [*Erysiphe graminis*] and brown rust [*Puccinia triticina*] but more susceptible to black rust [*P. graminis*].

KIRÁLY (Z.) & FARKAS (G. L.). **On the role of ascorbic oxidase in the parasitically increased respiration of Wheat.**—*Arch. Biochem. Biophys.*, **66**, 2, pp. 474–485, 1957. [37 refs.]

At the Research Institute for Plant Protection, Budapest, Hungary, the respiration of wheat seedlings of the vars. Bánkúti 1201 and F 481 inoculated with race 21 of *Puccinia graminis* [cf. **36**, p. 688] was compared with that of healthy plants. Infected tissues showed a considerable increase in O_2 uptake and contained a very

active ascorbic acid oxidase. The role of Fe catalysis in healthy plants was replaced by Cu catalysis in infected ones.

BASILE (RITA), LEONORI-OSSICINI (AGNESE), & ZITELLI (GIUSEPPINA). **Razze fisiologiche di *Puccinia graminis* var. *tritici* (Erikss. et Henn.) isolate da materiale raccolto in Italia (anni 1953, 1954, e 1955).** [The physiological races of *Puccinia graminis* var. *tritici* (Erikss. & Henn.) isolated from material collected in Italy (years 1953, 1954, and 1955).]—*Boll. Staz. Pat. veg., Roma*, Ser. 3, **15** (1957), 1, pp. 5–16, 1958. [English summary.]

The new physiologic races of *P. graminis tritici* found by the authors in Italy [37, p. 223] from 1953–58 have now been given official numbers by Stakman and Stewart (University of Minnesota) on the International Register. The races originally identified in 1953 as 11, 17 (from Giuliani wheat), 17 (Little Club), 24, and P.G.R. 1–7 [35, p. 431] are now numbered, respectively, 17, 21, 75, 268 (R2), 245 (R–B), 269 (R3), 234 (R4), 270 (R5), 271 (R6), 271, and 272 (R7).

In 1954, 14 races were identified, of which only 17, 21, 245, and 272 had previously been isolated in Italy; of the remainder, 11, 14, 16, 34, 115, and 207 had been reported elsewhere, while 250 (R10), 251 (R11), 252 (R12), and 253 (R13) appeared to be new.

Of the 41 races identified in 1955, 11, 14, 16, 17, 21, 34, and 75 had previously been found in Italy, while 19, 20, 24, 53, 57, 98, 111, 116, 176, 186, and 225 appeared to be new to Europe, and 274 (R14) and 290 (R36) new to the world.

WALLEN (V. R.). **Control of stem rust of Wheat with antibiotics. II. Systemic activity and effectiveness of derivatives of cycloheximide.**—*Plant Dis. Repr.*, **42**, 3, pp. 363–366, 1958.

This further report from the Canada Dept Agric., Ottawa [cf. 35, p. 5], concerns the use of actidione derivatives for the control of stem rust (*Puccinia graminis*) on Garnet wheat [cf. 36, p. 714; 37, p. 468]. On plants growing in quartz sand the acetate and semicarbazone taken up by the roots showed more systemic activity than the oxime. In field tests with 2 spray applications, 1 at heading followed by another 2 weeks later, the above derivatives and the methylhydrazone and thio-semicarbazone effectively controlled rust. Antibiotic activity persisted for at least 2 weeks after the 2nd application and the semicarbazone remained active for 6 weeks. When applied as a spray at 150 p.p.m. all the derivatives caused slight to moderate leaf necrosis. The opt. conc. for rust control would appear to be 50 p.p.m. or less at approx. 40 gal./acre.

FORSYTH (F. R.) & PETURSON (B.). **Control of stem and leaf rust of Wheat with fungicides.**—*Canad. J. Pl. Sci.*, **38**, 2, pp. 173–180, 1958.

Effective control of wheat stem and leaf rusts (*Puccinia graminis* [see above] and [*P. tritici*ina: 37, p. 345]) was obtained in field trials at the Canada Dept Agric., Winnipeg, by 4–5 applications each of $1\frac{1}{2}$ (Imperial) qt. nabam (19%) + $\frac{3}{4}$ lb. ZnSO_4 /acre provided that treatment was begun when only a trace of rust was present and that rainfall was not too heavy during the spraying programme. The cost of the chemicals is approx. \$5/acre compared with \$14 for sulphur dust. Calcium sulphamate controlled the rusts systemically but affected germination and milling quality. It was concluded that while it is possible to protect susceptible wheat economically from stem and leaf rust it is more practical to continue the use of resistant varieties.

BROMFIELD (K. R.) & EMGE (R. G.). **The effect of DDT on the rust reaction of several Wheat varieties to Wheat stem rust.**—*Plant Dis. Repr.*, **42**, 3, pp. 354–359, 1958.

To compare the effect of DDT on the rust reactions of wheat vars. other than

Khapli [25, p. 336] 113 vars. normally resistant to race 56 of *Puccinia graminis* [see below] at 70° F. or below were tested, together with Khapli, by the U.S. Army Chemical Corps, Fort Detrick, Frederick, Maryland. Of the 8 vars. that became susceptible as a result of the treatment, 7 were durum wheats and the 8th Khapli, all being in the tetraploid series, with 14 chromosome pairs, though not all such wheats in the series were similarly affected. None of the hexaploid series (21 chromosome pairs) lost resistance. Five of the DDT-sensitive vars. had been imported from the Iberian Peninsula and 2 from N.E. Africa, but these may all have been originally derived from the same source. It is suggested that the alteration of the rust reaction may be due to an increase of the amino acid and carbohydrate content of the leaves [cf. 37, p. 224].

CAMPBELL (A. B.) & MCGINNIS (R. C.). **A monosomic analysis of stem rust reaction and awn expression in Redman Wheat.**—*Canad. J. Pl. Sci.*, 38, 2, pp. 184–187, 2 pl., 1958.

At the Canada Dept Agric., Winnipeg, crosses of monosomic Redman wheat with Prelude revealed that factors for adult plant resistance to race 56 of *Puccinia graminis* [37, p. 272 and above] were carried by chromosomes III, VIII, and XIII of Redman. These genes are complementary and dominant.

EMGE (R. G.) & BROMFIELD (K. R.). **The use of controlled temperature and selected hosts to differentiate between two cultures of Wheat stem rust.**—*Plant Dis. Reprtr*, 42, 3, pp. 360–362, 1 fig., 1958.

In view of the difficulty in distinguishing between certain isolates of races 17 and 29 of *Puccinia graminis* [37, p. 272] inoculation tests were made at Fort Detrick, Frederick, Maryland, on the 12 standard differentials [24, p. 272] and 26 additional vars. at controlled temperatures. Of the 5 additional vars. that produced differential reactions at 75° F. or lower the most satisfactory was Bowie, especially at 70°, developing 0:1 type infection with race 17 and the susceptible 3 type with 29.

ASLAM (C. M.). **Relationship of genes for rust resistance in vulgare Wheat varieties.**—*Diss. Abstr.*, 17, 11, pp. 2368–2369, 1958.

At the University of Minnesota the wheat var. Kenya Farmer was crossed with 11 other spring wheats, all resistant to 1 or more races of *Puccinia graminis* [37, p. 272]. The mature plant field reaction showed that at least 3 genes were responsible for resistance; 1 dominant was carried in Kenya Farmer and there were complementary ones in Egypt N.A. 95.

In similar studies with leaf rust [*P. tritricina*: 37, p. 346] Kenya Farmer and Lee were resistant and the other vars. susceptible. Kenya Farmer carried 1 resistant recessive gene. In all the crosses with this var. susceptibility was dominant excepting that with Thatcher [see below], which carried 2 complementary genes for susceptibility as well as 1 for resistance.

In the seedling reaction to *P. graminis* (race 15B) of crosses of the resistant Kenya Farmer, Kenya 58, and Kenya 117A, 3 independently inherited genes governed resistance. In resistant \times susceptible vars. 2 genes, S, S₂, for susceptibility were epistatic to the resistant genes. Seedling reaction to races 38 and 11 was governed by 3 independently inherited genes for resistance and 1 for susceptibility. The resistant gene was epistatic to the susceptible.

The only associations in rust reaction were in the field reaction of the F₂ and the F₃ seedling reaction to 15B in the crosses Timstein-Henry \times Kenya Farmer and Mida \times Kenya 117A; and between the seedling reaction to races 38 and 11 in Kenya 58 \times Kenya Farmer and Thatcher \times Kenya Farmer.

UNRAU (J.), KUSPIRA (J.), & PETERSON (F. R.). **Note on leaf rust reaction of Chinese Spring (Thatcher) substitution lines.**—*Canad. J. Pl. Sci.*, **38**, 2, pp. 268–9, 1958.

During trials with naturally-infected substitution lines of Chinese Spring (Thatcher) wheat in 1954 and 1955, reactions to the prevalent races of leaf rust, *Puccinia triticina* [see above], 5a, 15a, and 126a, indicated that the genes for mature plant resistance located on chromosomes IX and XXI were more effective than those on X and XII [cf. **36**, p. 521].

BASILE (RITA), LEONORI-OSSICINI (AGNESE), & ZITELLI (GIUSEPPINA). **Identificazione di razze fisiologiche di *Puccinia rubigo-vera* tritici (Erikss. et Henn.) Carl. (= *P. triticina* Erikss.) isolate da campioni provenienti da varie regioni d'Italia (anni 1953, 1954 e 1955).** [Identification of the physiologic races of *Puccinia rubigo-vera tritici* (Erikss. & Henn.) Carl. (= *P. triticina* Erikss.) isolated from specimens from various parts of Italy (years 1953, 1954, and 1955).]—*Ann. Sper. agr.*, N.S., **12**, 2, *Suppl.* pp. ciii–cxiv, 1958. [English summary.]

Among the 19 physiologic races of *P. triticina* isolated in Italy in 1953 and 1954 [**37**, p. 153] 3, previously unknown, have now received the official numbers of 164, 165, and 166. In 1955, 18 races were recognized, including 3 new ones. Among races known to be present in various parts of the world, races 26, 45, and 51 were new for Italy, while races 2, 33, 38, 51, 58, 62, and 124 have not yet been reported from other parts of Europe. The new races are 167, 168, and 169.

PETRALIA (L.). **Un triennio di esperienze di lotta contro la 'carie' del Frumento.** [Three years of experiments on the control of Wheat bunt.]—*Ann. Sper. agr.*, N.S., **12**, 2, pp. 651–679, 2 fig., 1958. [English summary. 61 refs.]

Experiments conducted at the Stazione Sperimentale di Granicoltura per la Sicilia, Catania, during 1952–3 and 1954–56 with non-copper products [cf. **35**, p. 288] for the control of wheat bunt, caused chiefly by *Tilletia tritici* [*T. caries*] and *T. levis* [*T. foetida*: cf. **36**, p. 15], showed that agrosan GN, F.B.1, S.65, and pentagran were all as effective as Caffaro powder, though S.55 (containing mercuric pentachlorophenate), sesan, and tetrasan (containing 10% thiram) were somewhat less so. A high soil temperature after sowing appreciably increased infection, whereas soil humidity had very little effect.

ROANE (C. W.) & STARLING (T. M.). **Effects of a mercury fungicide and an insecticide on germination, stand, and yield of sound and damaged seed Wheat.**—*Phytopathology*, **48**, 4, pp. 219–223, 1958. [22 refs.]

A decline in germinability of treated wheat seed in Virginia in 1954 from 92 to 76% was shown at Virginia Agricultural Experiment Station, Blacksburg, to have been caused by mercurial treatment [cf. **36**, p. 460] of seed that was cracked or chipped. Ceresan M proved severely phytotoxic when pieces of the pericarp were missing, slightly so when it was split, and innocuous to undamaged seed.

PAPAVIZAS (G. C.). **Factors influencing invasion of stored Wheat seed by *Aspergillus* spp. and the effects of such invasion on germination and amount of germ damage.**—*Diss. Abstr.*, **17**, 11, pp. 2397–2398, 1957.

Much of this information has already been noticed [**37**, p. 471 *et passim*]. *A. candidus* was a strong competitor in mixtures with other fungi on wheat stored at 80–85% R.H. but could not compete with members of the *A. glaucus* group at 75% R.H.

Hard red winter and white wheats were more susceptible to fungus invasion than hard red spring and durum wheats, possibly because of their higher moisture

content at a given R.H. compared with the more resistant wheats. *A. candidus* and *A. glaucus* penetrated the outer cell layer of the coleorrhiza and coleoptile in 10–20 days at R.H. 80%. The embryonic tissues were invaded in 30–35 days. The typical discoloration of germ-damaged wheat followed mass invasion of the embryo.

SPICHER (G.). Grenzwerte der Temperatur und der relativen Luftfeuchtigkeit für das Wachstum von Bakterien und Schimmelpilzen in lagernden Weizenstärken.

[Limits of temperature and relative humidity for the growth of bacteria and moulds in stored Wheat starches.]-*Stärke*, **9**, 6, pp. 103–108, 12 graphs, 1957.

[English summary.]

At the Bundesforschungsanstalt für Getreideverarbeitung, Detmold, Germany, wheat starch with a mean water content of 12% and 6,850 [unspecified] mould spores/g. [37, p. 471] was stored for up to 50 days at 20°, 25°, and 30° C. and at R.H. 65, 70, 80, 90, and 100%. The moulds proved capable of development at all temperatures, even at the normal levels of R.H. (70–80%). They are therefore much more important as a potential source of damage than bacteria.

TYNER (L. E.). The effect of water on the partial sterilization of Barley seed by propylene oxide and by heat.—*Phytopathology*, **48**, 3, pp. 177–178, 1958.

At the Canada Dept Agric., Ottawa, 0, 10, 20, or 30% (w/w) of water was added to 50 g. quantities of Glacier barley seed in 1 l. flasks together with 0, 0.5, 0.75, 1.0, or 1.25 ml of propylene oxide, the flasks then being sealed for 24 hr. After plating the kernels on potato dextrose agar bacteria were found, though some spp. had probably been destroyed. Of the fungi present, *Fusarium*, *Helminthosporium*, and *Alternaria* spp. were eliminated from both dry and moistened seeds, but *Rhizopus* spp. were suppressed only when the seed was moistened before addition of the chemical.

In alternative heat treatments water was added as above and the flasks kept at 40, 45, 50, 55, or 60°C. for 24 hr. Bacterial colonies were again found, *Xanthomonas* being dominant after the low temps. but suppressed by 55 or 60°. Heat treatment of dry seed failed to control fungi, but was more effective on moist. *R.* spp. were again the most difficult to control, but at 55 or 60° were largely eliminated when 20–30% water had been added.

GRAY (ELIZABETH G.). Some physiologic races of *Ustilago hordei* and *U. avenae* in Scotland.—*Plant Path.*, **7**, 1, pp. 14–16, 1958.

At the North of Scotland College of Agriculture, Aberdeen, collections of *Ustilago hordei* from bere barley grown in the islands of Shetland, Orkney, N. Uist, Benbecula, and Lewis, and from 2-rowed barley in Shetland, all proved to be identical with race 6, the most generally important race in the United States. Collections of *U. avenae* from oats from Edinburgh and Orkney and from black oat (*Avena strigosa*) from Orkney were identical with the American race 1. A collection of *U. hordei* from R. 30 oats grown in Aberdeenshire cannot at present be identified [cf. 34, p. 446].

PARKINSON (D.) & CHESTERS (C. G. C.). Occurrence of *Fusarium culmorum* (W. G. Sm.) Sacc. in the rhizosphere of Oats.—*Nature, Lond.*, **181**, 4625, pp. 1746–1747, 1958.

Studies at the University of Nottingham on the fungal components of the rhizosphere microflora of oats revealed striking changes in the fungi present with increasing age of the roots and at different positions in the rhizosphere. Isolations were made from the root-tip, the crown, and the zone between at 40, 90, 120, 140, and 180 days after germination. *F. culmorum* and other *F.* isolates (including *F. avenaceum*) increased in frequency with increasing age of the plants, most rapidly in

the crown zone and least at the tip. Increase in the amount of *F. culmorum* present in root material was recently demonstrated to be associated with the degree of decomposition of the root [cf. **37**, p. 148].

It would appear, therefore, that under an oat crop approaching senescence there develops in the soil a population of a potential pathogen which could have serious effects on a subsequent cereal crop.

BYRD (W. P.), EARHART (R. W.), & ESKEW (E. B.). **Oat chlorosis in South Carolina in 1957.**—*Plant Dis. Repr.*, **42**, 4, pp. 517–520, 1958.

In the Piedmont area of S. Carolina a chlorosis of oats, reported from the S. Carolina Agricultural Experiment Station, appeared during late March and early Apr., distinct from a condition attributed to mineral imbalance in soil of high pH. This chlorosis is yellow or golden and either interveinal or overall on the new leaves. Seriously affected plants are stunted and sometimes killed or they fail to head. The symptoms persist and may affect the glumes. Sometimes whole fields are affected, in others normal and chlorotic plants adjoin.

Under greenhouse conditions the symptoms were duplicated by growing susceptible oat plants in soil infested with *Helminthosporium* spp. isolated from affected plants. Production losses were estimated by comparing the yields of Victorgrain 48–93 and Arlington for 1954–56 when chlorosis was absent with those from 3 tests in 1957 when chlorosis was present. The former (badly attacked) averaged 7% more than Arlington (traces only) when no chlorosis was present, but 62% less when it was.

STOREY (H. H.) & RYLAND (AUDRIE K.). **Resistance in Maize to the tropical American rust fungus, *Puccinia polysora* Underw.**—*Heredity*, **11**, 3, pp. 289–301, 1 pl., 1957.

The phytopathological information in this paper has already been noticed [**37**, p. 406].

SMITH (D.) & NIEDERHAUSER (J. S.). **Occurrence of Corn stunt virus in Central America and Colombia.**—*Plant Dis. Repr.*, **42**, 4, p. 512, 1958.

Throughout Central America from Guatemala to Panama, and in Colombia, near Palmira, maize stunt virus [**35**, p. 602] was observed in 1956–7. Identification was based on symptomatology at the time of flowering. Of the 2 strains observed [loc. cit.] Mesa Central predominated in both years, although in 1957 the Rio Grande strain tended to increase slightly in Guatemala and Nicaragua.

DAVIDE (R. G.). **Effects of several fungicides for seed treatment of Corn.**—*Philipp. Agric.*, **41**, 6, pp. 295–305, 1957.

In 4 maize seed treatment trials in 1955–6 at the College of Agriculture, Laguna, with 7 proprietary fungicides and 1 insecticide stands of yellow and white flint maize under different conditions were significantly increased by all [cf. **32**, p. 182]. Arasan and phygon gave the best stands and were least injurious.

MATSUSHIMA (T.). **Production of chlamydospore-like bodies by a solopathogenic line of *Ustilago maydis* Corda.**—*J. Jap. Bot.*, **32**, 12, pp. 363–366, 6 fig., 1958.

At the Laboratory of Plant Pathology and Mycology, National Hygienic Laboratory, Setagaya, Tokyo, a solo-pathogenic line of *U. maydis* [**11**, p. 363; **35**, p. 12] was induced to form chlamydospore-like structures in shake culture (apparently for the first time on record) by the addition of copper sulphate to the glutamic acid-glucose medium. The chlamydospores resembled those produced in inoculated maize plants except in the echinulation.

GASKIN (T. A.) & ULLSTRUP (A. J.). **An estimate of the incidence of Corn smut and of the effects of the disease on yield in Indiana in 1957.**—*Plant Dis. Reprtr*, **42**, 3, pp. 374–375, 1958.

An evaluation is reported from Purdue University, Indiana, of the effect of size and location of the galls of *Ustilago maydis* [36, p. 184] on the yield of individual plants, using 6 disease classes [cf. 14, p. 436]. Important losses were incurred by ear galls, tassel galls, and large galls above the ear. The incidence of maize smut in Indiana in 1957 was slightly below average, and the estimated loss was 0·41%, or about 943,000 bush.

ZOGG (H.) & LANINI (F.). **Der gedeckte Hirsebrand und seine Bekämpfung.** [Sorghum covered smut and its control.]—*Mitt. schweiz. Landw.*, **5**, 8, pp. 146–148, 2 fig., 1957.

In plot trials in Tessino, Switzerland, in 1954 and 1955, carried out by the Eidgenössische Landwirtschaftliche Versuchsanstalt, Zürich-Oerlikon, mercury compounds applied as dust (200 g./100 kg. seed) to sorghum seed infected by *Sphacelotheca sorghi* [cf. 26, p. 197; map 220] produced clean panicles in both years, compared with 54·2 and 31% infection, respectively, in the untreated.

MASLOVSKII (A. D.). Различная патогенность возбудителя головни Проса **Sphacelotheca panici-miliacei (Pers.) Bubak.** [The varied pathogenicity of the causal agent of Millet smut *Sphacelotheca panici-miliacei* (Pers.) Bubak.]—*Proc. Lenin Acad. agric. Sci.*, **23**, 5, pp. 42–44, 1958.

In experiments in 6 districts of U.S.S.R. to detect suspected races of *S. panici-miliacei* [*S. destruens*; 37, p. 476] 11 resistant millet [*Panicum miliaceum*] vars. were inoculated. Only the hybrids VIR 1843 and VNIC 29 were resistant to inoculum collected in all the districts. The most virulent race was from the Timiryazev area.

TANAKA (Y.) & INAGAKI (N.). **Studies on the technique for the isolation for the presence of Rice grain fungi. I.**—*Bull. nat. hyg. Lab., Tokyo*, 75, pp. 443–459, 2 fig., 3 graphs, 1957. [Japanese. Abs. from English summary.]

Tests of various methods of isolating rice grain moulds, especially *Penicillium citrinum*, *P. islandicum*, and *P. citreo-viride* [cf. 33, p. 559], showed it to be necessary to modify the original technique (repeated washings of the grains in distilled water until the water is free from micro-organisms, and then planting the washed grains in tubes of Czapek agar) by adding 7·5% NaCl to acidified media (Czapek potato dextrose, or Waksman agar).

GREEN (V. E.) & ORSENIGO (J. R.). **Wild grasses as possible alternate hosts of 'hoja blanca' (white leaf) disease of Rice.**—*Plant Dis. Reprtr*, **42**, 3, pp. 342–345, 1 fig., 1958.

The occurrence of symptoms, similar to those of 'hoja blanca' [37, p. 282], is reported from the Everglades Experiment Station, Florida, on the grasses [37, p. 163] *Echinochloa walteri*, *Brachiaria plantaginea*, *Panicum capillare*, and, in particular, *Sacciolepis striata*.

VOLK (R. J.), KAHN (R. P.), & WEINTRAUB (R. L.). **Silicon content of the Rice plant as a factor influencing its resistance to infection by the blast fungus, *Piricularia oryzae*.**—*Phytopathology*, **48**, 4, pp. 179–184, 8 graphs, 1958. [25 refs.]

In further studies at Fort Detrick, Frederick, Maryland [37, p. 352], Caloro rice was grown in Hoagland solution No. 1 with Fe EDTA [cf. 36, p. 769] as the Fe

source and various amounts of Si and inoculated with either of 2 races of the pathogen. The rice leaf can accumulate Si in large amounts in accordance with its availability to the roots. It was found that Si content and susceptibility to *P. oryzae* were inversely related [cf. 33, p. 560]; susceptibility decreases as the leaf ages, and the more rapidly the later the leaves are produced. Evidence was obtained that increase of available N, which increases susceptibility, decreased Si uptake.

It is suggested that Si combines with 1 or more cell wall components, produced and incorporated in the wall during periods of active growth, to form a complex resistant to attack by the extracellular enzymes of *P. oryzae* [36, p. 786], so restricting hyphal penetration.

VARGAS (A. B.). **Panoja erecta, una enfermedad no parasítica del Arroz.** [Straight-head, a non-parasitic disease of Rice.]—*Suelo Tico*, 10, 38, pp. 11–12, 1 fig., 1958.

Straighthead [36, p. 663] was first observed in rice in Costa Rica in 1953 in the var. Rexark and studied at the Jardín de Introducciones del Campo Experimental Socorrito, Barranca. Draining of fields [36, p. 57] 2 weeks before the appearance of flower buds is recommended.

Outbreaks and new records.—*F.A.O. Pl. Prot. Bull.*, 6, 6, pp. 91–92, 2 fig., 1958.

R. S. VASUDEVA and S. P. CAPOOR report from the Indian Agricultural Research Institute, New Delhi, that citrus 'decline' disease has recently become widespread in Bombay State and is assuming alarming proportions. A disease of Mosambi sweet orange with symptoms resembling those of citrus tristeza virus [map 289], including partial defoliation, leaf curling, vein-clearing and -banding, yellowing, abnormal cropping, and in some cases rapid collapse, was transmitted by budding or grafting to seedlings of standard sour lemon, sour orange, and West Indian Key lime under insect-proof conditions. Kagzi lime (*Citrus aurantifolia* var.), grapefruit, and sangtra [clementine] were also observed to be affected by 'decline'.

KLOTZ (L. J.), WONG (P.-P.), & DEWOLFE (T. A.). **Damping-off of Sweet Orange seedlings by *Rhizoctonia solani* controlled with biphenyl.**—*Plant Dis. Repr.*, 42, 4, pp. 464–466, 2 fig., 1958.

At Riverside, California, the fungistatic action of biphenyl [diphenyl] on *Rhizoctonia* [*Corticium*] *solani* [26, p. 111] was confirmed; 5–40 g. applied to the top in. of soil in 1 gal. tins controlled damping-off of citrus seedlings by this pathogen, though proving somewhat phytotoxic.

BERRY (S. Z.). **Relative effects of ethyl thionocarbamate and dowicide A-hexamine on four Citrus fruit pathogens.**—*Plant Dis. Repr.*, 42, 4, pp. 467–473, 6 graphs, 1958.

At Orlando, Florida, 5% C.P. 2229 (ethyl thionocarbamate: Monsanto Chemical Co.) was more inhibitory than 2% dowicide A-hexamine [cf. 36, p. 810] to decay of oranges caused by *Diplodia natalensis*, *Phomopsis* [*Diaporthe*] *citri*, *Penicillium digitatum* [24, p. 447] and *P. italicum*, both formulations being fungistatic. *In vitro* neither chemical showed specificity for *D. natalensis* or *D. citri*, but C.P. 2229 controlled decay by *P. digitatum* more effectively than that by *P. italicum*.

NORMAN (P. A.). **Severe T₃ strain of tristeza virus transmitted by *Aphis gossypii* Glover.**—*J. econ. Ent.*, 51, 1, p. 45, 1958.

The results of recent tests in Florida demonstrated the ability of *Aphis gossypii* to transmit the severe T₃ strain of citrus tristeza virus [36, p. 693]. Sources of inoculum comprised potted seedlings of Pineapple sweet orange, Cleopatra mandarin,

rough lemon, and 'tangerina cravo', on which large colonies were fed for 24 hr. before transference of 300 aphids to 16 Key lime indicator plants for a transmission feed of at least 6 hr. Typical T_3 strain symptoms developed on 11 plants in 94 days.

BITANCOURT (A. A.). **Um inquérito a seca dos ramos do Cafeeiro.** [An inquiry into the desiccation of Coffee branches.]—*Biológico*, **24**, 2, pp. 19–22, 1958.

From the results of a questionnaire circulated among growers in São Paulo, Brazil, in Dec. 1956 (29% of replies) it appeared that the coffee disease characterized by severe desiccation of the branches, observed earlier in the year, had largely or entirely disappeared. It is attributed to a combination of 4 factors—malnutrition, intensive respiration of young leaves developing prematurely, chiefly in rainy seasons, and the pathogens *Colletotrichum coffeanum* [*Glomerella cingulata*] and *Pseudomonas garcae* [37, p. 42].

VIÉGAS (A. P.). **Podridão das raízes do Cafeeiro I, II.** [Root rot of Coffee. I, II.]—*Bol. Suptda Serv. Café, S. Paulo*, **32**, 368, pp. 7–16, 2 fig., 1 map; 369, pp. 10–19, 1957.

A full description is given of the history, nature, terminology, etiology, external and internal symptoms, and other points of interest connected with a widespread die-back and root rot of coffee (*Coffea arabica* and its vars.) in São Paulo, Brazil, caused by *Marasmius viegasii* Singer sp. nov. *M. viegasii* has a smooth, radially sulcate, cinnamon-tawny pileus, 60–70 mm. diam., lamellae of the same colour, 5 mm. in width; a darker-coloured stipe, the upper part glabrous or subglabrous, the base tomentose, ca. 5 mm. diam. and exceeding the diam. of the pileus in length; continuous, rarely uniseptate, cylindrical, hyaline, thin-walled basidiospores, on 4-spored clavulate basidia, $20-28 \times 4-5 \mu$, measuring $16 \times 4 \mu$ and germinating readily; and dark brown to black rhizomorphs, formed by hyphae 8–12 mm. diam., which invade the cortical and parenchymatous tissues of the roots and destroy lignin but do not extend very far into the wood; the rot is of the white type. The vessel walls may show fairly well-marked etchings. The affected trees perish within a few days of the development of foliar chlorosis and wilting.

M. viegasii makes good growth on potato dextrose agar and sections of sterilized coffee branches in pyrex flasks. The latter served as infective material for partially asphyxiated roots, this drastic method of inoculation being the only successful one of several tested. In nature the fungus passes, probably by means of the mycelium, from the soil to roots weakened by excessive humidity, lack of oxygen, or nutritional deficiency, causing gradual decay which culminates in 'apoplexy', as indicated above. Control should be based on sound cultural methods aimed at the avoidance of such conditions.

RODRIGUES (C. J.). **Nota sobre a resistência de algumas espécies de Coffea à Hemileia coffeicola Maubl. et Rog.** [A note on the resistance of some species of *Coffea* to *Hemileia coffeicola* Maubl. et Rog.]—*Rev. Café portug.*, **3**, 12, pp. 48–71, 1957. [English summary.]

In an experiment at Roca Trás-os-Montes, in the island of S. Thomé, Gulf of Guinea, at 800 m., natural and artificial infection with *H. coffeicola* [cf. 34, p. 367] was studied in various *Coffea* spp., obtained from the Centro de Investigação das Ferrugens do Cafeeiro, Oeiras, Brazil. The results of inoculations, and the fact that in S. Thomé the pathogen is only prevalent at altitudes above 500 m., where moisture is abundant, indicated that humidity is the most important factor in infection. All plants of *C. arabica* so far inoculated have proved susceptible, even where there was resistance to the entire range of strains of *H. vastatrix* available at Oeiras. *C. racemosa*, readily infected by *H. vastatrix*, was not susceptible to infection by uredospores of *H. coffeicola*. With the exception of *C. eugeniioides*,

C. aruwimiensis, *C. liberica*, *C. canephora* var. *robusta*, *C. abeokutae*, and *C. excelsa*, which showed varying degrees of susceptibility, other species were immune or responded by the formation of 'swellings' only.

BROWN (H. B.) & WARE (J. O.). **Cotton**.—3rd Ed., x+566 pp., 144 fig., New York, Toronto, London, McGraw-Hill Book Company, Inc., 1958. 93s.

A chapter on diseases (pp. 169–197) is included in this useful manual on the botanical, industrial, and commercial aspects of cotton production.

PORZHENKO (V. V.) & MOSKOVETS (S. N.). Гоммоз (бактериоз) Хлопчатника и мероприятия по борьбе с ним на Украине. [Gummosis (bacteriosis) of Cotton and measures for its control in the Ukraine.]—Труд. Укр. н.-и. ин-та Хлопк. Защ. раст. [*Trud. ukr. nauch.-issled. Cotton Inst., Zashch. Rast., Kiev.*], 1956, pp. 9–31, 1 fig., 1 graph, 1956. [Received May 1958.]

In studies at the Microbiological Institute of the Ukraine Academy of Sciences, U.S.S.R., C-1579, C-3398, and C-3381, the 4 local cotton vars. 6095-U, 3982-U, and Ukr-1 and 2, and the hybrids 3521×C-1579, 6095×C-1579, 6095×137 F, 3988×C-1579, and 3521×C-1582 were resistant to *Bacterium* [*Xanthomonas*] *malvacearum* [see below]. The best control was given by granosan at 8–10 kg./ton seed, which also proved effective against root rot [*Moniliopsis aderholdii*: 37, p. 480].

PORZHENKO (V. V.) & РОДКОРАУ (І. Е.). Меркуран-препарат комплексного действия в борьбе с вредителями и болезнями Хлопчатника. [Mercuran-compound with complex effectiveness in the control of pests and diseases on Cotton.]—Труд. Укр. н.-и. ин-та Хлопк. Защ. раст. [*Trud. ukr. nauch.-issled. Cotton Inst., Zashch. Rast., Kiev.*], 1956, pp. 120–123, 1956. [Received May 1958.]

In experiments in the S. and W. Ukraine, U.S.S.R., on materials with combined effectiveness against pests and gummosis [*Xanthomonas malvacearum*: see above] mercuran gave the best results, reducing bacterial infection to 6.2% against 14.6% for granosan and almost eradicating the thrips population. As only 6 kg./ton seed is required mercuran is much more economical than other compounds.

MOSKOVETS (S. N.). Увядание Хлопчатника и пути борьбы с ним на Украине. [Cotton wilt and methods for its control in the Ukraine.]—Труд. Укр. н.-и. ин-та Хлопк. Защ. раст. [*Trud. ukr. nauch.-issled. Cotton Inst., Zashch. Rast., Kiev.*], 1956, pp. 46–55, 1956. [Received May 1958.]

In a comparative study in the Ukraine and Azerbaijan the incidence of *Verticillium dahliae* [37, p. 355] in cotton grown in a field previously planted with lucerne and certain [unspecified] cereals for at least 2 years was only 0.5–3.7% compared with 25%–97.2% in fields previously bearing other crops. 108-F, C-3424, C-450-550, 1363, 2018 and the hybrids 3980-U, 3521-U, 3982-U, and 3988, all ×108-F, were highly resistant. K applications increased resistance. A spacing of 70×10 cm. per plant proved the best, with 4.9% infection as against 33.7% for 70×40 cm. The author recommends that seed for all the districts of the U.S.S.R. should be selected from areas with little or no infection. Strains 5320 and 4966 of the antibiotic fungi [loc. cit.] incorporated in the soil decreased the disease and increased yield.

ANSELME (C.) & BOURGEOIS. **Carence et maladie cryptogamique sur *Linum usitatissimum***. [Deficiency and a cryptogamic disease of *Linum usitatissimum*.]—*C. R. Acad. Agric. Fr.*, 44, 4, pp. 195–200, 1958.

Flax growing in some parts of the Seine-Maritime, the Somme, and Eure, France,

was dwarfed, the middle leaves bore necrotic white spots, and the top leaves oily white spots surrounded by a whitish halo. In many the group of leaves above the cotyledons formed a rosette, the terminal bud wilted, and the lateral buds of the cotyledons developed into axillary branches, often replacing the dead terminal bud. *Polyspora lini* was isolated from the brown spots and sometimes from the necrotic white ones. Soil analyses indicated that the condition was due to a complex of fungal disease and Zn deficiency, though possibly there may have been a deficiency of other micro-elements.

BYFORD (W. J.). **Phytophthora verrucosa on Dahlia.**—*Plant Path.*, **7**, 1, p. 38, 1 pl., 1958.

Towards the end of May, 1957, dahlia seedlings affected by a general wilt were received at East Craigs, Edinburgh, from a Border nursery. Oogonia and oospores of *P. verrucosa* [cf. **31**, p. 256] were observed in the roots. This constitutes a new host record.

LEBLOND (D.). **Désinfection de bulbes de Glaïeul.** [The disinfection of Gladiolus corms.]—*Rep. Quebec Soc. Prot. Pl.*, **39** (1957), pp. 55–58, 1958.

The results are presented of dust treatment at Ste-Foy, Quebec, of small lots of gladiolus corms against *Sclerotinia gladioli* during 1952–56 with arasan, semesan, spergon, slaked lime, fermate, sublimated S, and captan 50% M, and against *Fusarium oxysporum* f. *gladioli* [**37**, p. 482] in 1955–6 with captan 50% M, sublimated S, spergon, and thioneb 25% M. Captan gave 70–80% plants free from *S. gladioli* and 45–50% free from yellows, the figures for spergon being 50–80 and 37.5–43.5, and for thioneb (one test for each only) 82.5 and 40.

GOULD (C. J.), EGLITIS (M.), & MACLEAN (N. A.). **Botrytis hyacinthi in the United States.**—*Plant Dis. Repr.*, **42**, 4, pp. 534–535, 2 fig., 1958.

B. hyacinthi [cf. **13**, p. 704] was first reported in the United States on hyacinths at Mt. Vernon, Washington, in 1949, and again at Puyallup, Washington, in 1956. There appears to have been no spread from the original hosts, which were imported.

HARRISON (D. J.). **A Fusarium rot of bulbous Iris.**—*Plant Path.*, **7**, 1, pp. 16–18, 1 pl., 1958.

In the autumn of 1956 iris bulbs from Holland and the Mediterranean area imported into Guernsey were found to be affected by a soft, brown, basal rot caused by a strain of *F. oxysporum* [cf. **32**, p. 433]. The disease is not likely to become a major problem. The opt. temp. for the growth of the fungus was 70°–80° F. and the evidence obtained suggested that the storage temp. greatly influenced the development of the disease in transit.

In many instances species of *Penicillium* developed in the affected bulbs and it was often difficult to isolate *F. oxysporum* after such secondary infection. *P. corymbiferum* [**37**, p. 170] was also a cause of primary infection.

KIVILAAN (A.) & SCHEFFER (R. P.). **Factors affecting development of bacterial stem rot of Pelargonium.**—*Phytopathology*, **48**, 4, pp. 185–191, 4 graphs, 1958.

These studies at Michigan State University, East Lansing, were chiefly on *Pelargonium* var. Ricard, moderately susceptible to *Xanthomonas pelargonii* [**36**, p. 31; **37**, p. 44], and also on Better Times and Radio Red. The effect of nutrient concentration was followed in Gallegly and Walker's solutions [cf. **29**, p. 181]. The organism was systemically present in the vessels of cuttings which had taken up a bacterial suspension by transpirational pull, and root invasion was demonstrated in potted plants, but contact with the parenchyma by wounding was necessary before external rot symptoms developed. The pathogen did not become systemic

from leaf spots. The pH limits for growth in culture were 5.6–8.4, but infection occurred in plants with a much lower sap pH, sap in diseased stems becoming alkaline. Latent infection of commercial stocks was prevalent; 26% of 600 plants of 6 vars. developed stem rot within 3 months under conditions favouring the disease.

Inoculation of 93 spp. from 40 families indicated that only the Geraniaceae is attacked. Different isolates varied in pathogenicity, particularly in the production of leaf spots, some isolates causing only stem rot. Temperature was a major factor, disease development being slow with a night temp. of 10° C., faster at 21°, and rapid at 27°. High N and P, low Ca, and low nutrient levels in general increased the severity of the disease.

STESSEL (G. J.). **Botrytis control in stored Rose stocks.**—*Plant Dis. Reprtr*, **42**, 3, pp. 396–398, 1958.

Tests for the control of *Botrytis* sp. on dormant rose bushes, placed in plastic bags in cold storage for 3 months, were made at Rhode Island Experiment Station, Kingston, with 11 fungicides applied either as aqueous dips, dusts, or vapour. Judged by control of the pathogen and subsequent growth of the plants captan (7.5% dust) and dips of 4,800 p.p.m. vancide 51 and kromad [cf. **36**, p. 673] and 500 p.p.m. mycostatin were the most effective.

GOIDÀNICH (G.). **Frutticoltura e patologia vegetale.** [Fruit cultivation and plant pathology.]—*Ital. agric.*, **94**, 9, pp. 831–843, 12 fig., 1957.

Up-to-date information is presented on some well-known fruit diseases of economic importance in Italy and their control. An illustrated schedule of protective treatments for peach and apple is included.

IVANOV (P.). Нови химически средства за борба с вредителите в овощарството. [New chemical means for the control of parasites in fruit growing.]—Овощ. и Градинарст. [*Veg. Grg & Hort.*, Sofia], 1957, 6, pp. 16–19, 1957.

In this survey of newly introduced insecticides and fungicides in Bulgaria, their properties, and use, zineb (at 300 g./100 l. before blossoming and 200 g. after) is noted as being well suited for the control of apple and pear scab [*Venturia inaequalis* and *V. pirina*], plum rust [*Tanzschelia pruni-spinosae*], and unspecified diseases, controlled hitherto with Bordeaux mixture.

Fuclasin-ultra [cf. **36**, p. 570] at 0.2% proved very successful against downy mildew [*Plasmopara viticola*: **37**, p. 390] on vine; and captan (at 250 g.) was also used very effectively against scab on fruit trees and vine downy mildew.

MOORE (M. H.). **The release of ascospores of Apple scab by dew.**—*Plant Path.*, **7**, 1, pp. 4–5, 1958.

At East Malling Research Station leaves of Bramley's Seedling apple, naturally infected by scab [*Venturia inaequalis*: cf. **35**, p. 777], were overwintered in the field, air-dried, and then exposed to dew, when numerous ascospores were found in the dew drops. In Van Tieghem cells, however, where surface water is retained, the spores were more likely to be submerged than to become airborne, and under such conditions very few may remain in the perithecia for discharge when subsequent drying occurs. It is suggested that alternating wetting (thorough but not prolonged) and dryness favour the maximum air-disposal of spores.

ZOBRIST (L.) & BOHNEN (K.). **Eine Methode zur Massenproduktion einheitlicher, keimfähiger Konidien von *Venturia inaequalis* (Cke) Wint.** [A method for the mass production of uniform, germinable conidia of *Venturia inaequalis* (Cke) Wint.]—*Phytopath. Z.*, **31**, 4, pp. 367–370, 2 fig., 1958. [English summary.]

From the laboratory of Dr. R. Maag, A. G., Dielsdorf-Zürich, a simple method of

culturing *V. inaequalis* [36, p. 35] for fungicidal tests is described. Single ascospore cultures are maintained by subculturing alternately on malt agar and a mineral medium plus amino acetic acid at 8-weekly intervals. For conidia production the fungus is transferred to small pieces of 1-year-old Boskoop or White Winter Calville apple shoots. The shoots are prepared by removing the bark, cutting into 5 cm. lengths, and sterilizing for 1 hr. with 5 ml. glass-distilled water. They are then kept in test-tubes with 0.8–0.2 ml. of a nutrient containing 50 g. sucrose, 30 g. fresh apple juice, 20 g. malt extract, 4 g. amino acetic acid, 1.5 g. potassium dihydrogen phosphate, 0.15 g. magnesium sulphate, and 0.13 g. potassium nitrate in 1,000 ml. water after 2 sterilizing periods of 45 min. at an interval of 72 hr. Inoculation is carried out with a piece of agar bearing good mycelial growth placed midway up the shoot, a position found to give the best results. Incubation is in darkness at 18° C.; large quantities of spores were produced in 18–20 days. The conidia are removed with a soft brush into about 15 ml. glass distilled water, this spore suspension being filtered through glass wool to remove any mycelial remains. This practically precludes any enrichment of the spore suspension from the nutrient, thus eliminating uncontrolled influences on germination. In order to offer the fungus the largest possible surface, the min. diam. of the shoots should be 5 mm. An av. spore germination capacity of 85% was obtained with 35–50,000 spores/ml. The spores were highly sensitive to all fungicides tested. An increased germination capacity can be obtained by addition of sterile lemon juice.

SIMARD (J.), PELLETIER (R. L.), & COULSON (J. G.). **Screening of microorganisms inhabiting Apple leaf for their antibiotic properties against *Venturia inaequalis* (Cke) Wint.**—*Rep. Quebec Soc. Prot. Pl.*, **39** (1957), pp. 59–67, 2 pl., 1958.

At Macdonald College, Quebec, agar plates containing colonies of micro-organisms isolated from dead apple leaves were sprayed with spore suspensions of *V. inaequalis*; after incubation colonies that prevented the germination of the conidia were isolated and cultured, 16 of these isolates (which included 12 of *Penicillium*, 1 of *Aspergillus*, and 1 of *Trichoderma viride*) being assayed in agar-streaking tests against *V. inaequalis* and *Phytophthora infestans*. Three *Penicillium* isolates produced diffusible materials antibiotic to *V. inaequalis* when grown in different liquid media.

POWELL (D.), KHETTRY (A.), SASAKI (P. J.), & BRUSSELL (G. E.). **The fungicidal efficacy of cyprex against Apple scab.**—*Plant Dis. Repr.*, **42**, 4, pp. 493–498, 1958.

At the University of Illinois, Urbana, good control of apple scab [*Venturia inaequalis*] was obtained with cyprex (70% n-dodecylguanidine acetate), foliage infection being reduced from 95 to 23% and fruit infection to 0–1%. Application at $\frac{3}{4}$ lb./100 gal. appeared to be sufficient; even at 2 lb. only 5 p.p.m. residue was left on the fruit. Cyprex protects the fruit from infection over a much longer period than other fungicides and the 2 lb. rate protects the foliage satisfactorily for approximately 30 days.

PETRONIJEVIĆ (M.). **Suzbijanje čađave krastavosti na Jabuci sa osvrtom na rentabilnost ove mere.** [The control of Apple scab and an investigation of its profitability.]—*Zasht. Bilja* (*Plant Prot.*, Beograd), 1957, 39–40, pp. 61–72, 1957. [French summary.]

Experiments on the control of apple scab (*Venturia inaequalis*) [36, p. 6] at the Institute of Plant Protection, Karaguevats, Yugoslavia, in 1955–6 are described, with full details of the costs. Zineb and venturicide [cf. 36, p. 329] are recommended.

HEY (G. L.) & HUNNAM (D.). **Results of spray trial for Apple mildew.**—*Grower*, **49**, 21, p. 1336, 1958.

In field trials in Kent in 1957 and 1958 good control of apple mildew [*Podosphaera leucotricha*: **37**, p. 486] was given by 2 lb. orthocide wettable (50%) + karathane (1 lb.)/100 gal. There were 4.16% infected buds in 1957 and 4.75% in 1958 compared with 8.75 and 30.58 on the untreated. Almost as good results were achieved with captan (2 lb.) + wettable sulphur (2½ lb.), 5.41% and 11.08%, and 16 fl. oz. mercurite, 5.41% and 11.58%. All treatments were applied 7 times from 17 Apr.–10 July as high-volume sprays.

HUNNAM (D.), BAGNALL (B. H.), & BENNETT (M. F.). **Gloeosporium-surprise in pruning trial.**—*Grower*, **49**, 17, pp. 1069–1071, 1958.

In trials to test the possibility of controlling *Gloeosporium* cankers on apple by pruning all visible cankers severely only autumn spraying reduced fruit infection, while pruning had no effect except in one trial where severe pruning increased fruit infection owing to large-scale re-infection of the wood and a large population of vigorous cankers. Results suggested that *G. [Neofabraea] perennans* was capable of surviving on the tree in places other than in cankers (e.g. the bark).

EAVES (C. A.), HOCKEY (J. F.), & ROSS (R. G.). **Effects of orchard fungicides on stored McIntosh Apples.**—*Canad. J. Pl. Sci.*, **38**, 2, pp. 246–251, 2 graphs, 1958.

In a comparative study of the effects of 5 fungicidal treatments in the field on the subsequent storage of McIntosh apples at the Canada Dept Agric., Kentville, Nova Scotia, during 1954–56, phenyl mercuric acetate (up to the calyx stage), in comparison with full schedules of captan 50–W, crag fruit fungicide 341 (glyodin), magnetic sulphur paste, and fermate, gave the least fungal rotting (due to *Penicillium* sp. and *Gloeosporium album*) [cf. **36**, p. 704] and also the highest acid content in the fruit after 5–6 months at 32° F.

STOJANOVIĆ (D.) & KOSTIĆ (B.). **Kretanje intenziteta napada *Monilia fructigena* (Aderh. et Ruhl.) Honey i *Monilia laxa* (Ehrenb.) Sacc. na Šljivama, Jabukama, njihoi međusobni odnos u prirodi.** [Fluctuations in the intensity of attack by *Monilia fructigena* (Aderh. et Ruhl.) Honey and *Monilia laxa* (Ehrenb.) Sacc. on Plum and Apple trees and their mutual relationship in nature.]—*Zasht. Bilja (Plant Prot., Beograd)*, 1957, 39–40, pp. 81–87, 2 graphs, 1957. [English summary.]

Comparative investigations in Serbia, Yugoslavia, in 1955 showed that *M. [Sclerotinia] fructigena* predominated in some 80% of the orchards, and is more prevalent later in the season, increasing on plum from mid-July to a max. towards the end of Aug. and on apple increasing in early July to a max. in early Aug. *M. [S.] laxa*, which predominated in the remaining orchards seen, decreased on plum in early July, rising again to a max. at the end of Aug., whereas on apple a max. in early July was followed by a sharp decrease.

FARABEE (G. J.) & LOCKWOOD (J. L.). **Inhibition of *Erwinia amylovora* by *Bacterium* sp. isolated from fire blight cankers.**—*Phytopathology*, **48**, 4, pp. 209–211, 1958.

At the Ohio Agricultural Experiment Station, Wooster, a non-pathogenic, yellow *Bacterium* sp., frequently isolated together with *E. amylovora* from cankers on pear and apple, inhibited the growth of the pathogen in culture, apparently by increasing the acidity of the medium to an unfavourable level. One isolate appeared to produce an antibiotic which inhibited *E. amylovora* in both buffered and unbuffered media.

CHABANNES (J.), DUPRAT (A.), & TROCMÉ (S.). **Observations sur le traitement de la chlorose des Poiriers.** [Observations on the treatment of chlorosis of Pear trees.]—*C. R. Acad. Agric. Fr.*, **44**, 1, pp. 46–50, 1958.

In 4 years' work on the treatment of chlorosis of pear trees [cf. **36**, p. 425] in the vicinity of Paris with certain chelates these materials were effective when brought near the roots by means of an injector at 15 kg. pressure and at 3–10 g. Fe/sq. m. Foliage sprays with Fe chelates, especially Fe EDTA, gave acceptable if imperfect results. Injections into the trunk at the end of winter with Fe in solid form were also effective, as were liquid injections, but the methods of controlling chlorosis do not yet make it worth while to plant pear trees in calcareous soils.

ROLAND (G.). **Sur quelques essais d'identification de viroses chez les Prunus.** [On some tests for the identification of viroses of *Prunus*.]—*Parasitica*, **14**, 1, pp. 10–16, 2 pl., 1958.

In further work at the Station de Phytopathologie de l'État, Gembloux, Belgium, on the identification of fruit tree viroses [cf. **34**, p. 792] grafting to wild cherry (*Prunus avium*) seedlings, F 12/1, Napoleon, and Ste Lucie cherries (*P. mahaleb*), Nord cherry (*P. cerasus*), and peach seedlings was carried out with material from (1) a French Early Rivers cherry, 25 yr. old, growing in the province of Limburg, (2) a 3-yr. old Hedelfinger Riesenkirche cherry in the province of Liège, and (3) a cherry tree of unknown variety growing near Namur.

From the symptoms produced it is concluded that the Early Rivers was probably affected by [cherry] mottle leaf virus [cf. **15**, p. 664, *et passim*]; and trees 2 and 3 by a virulent strain of [peach] golden net virus [cf. **22**, p. 257], tree 2 also probably being affected by another virus, which might be named 'cherry white mottle virus', producing white patterns, chiefly marginal, with a marked folding-over of the blade along the midrib.

GOSS (OLGA M.). **Bacterial canker of stone fruits.**—*J. Agric. W. Aust.*, Ser. 3, **7**, 1, pp. 73–78, 12 fig., 1958.

A popular account of bacterial canker (*Pseudomonas syringae*) [map 336; cf. **36**, p. 454] of stone fruits in Western Australia, where in recent years the disease has become more widespread, and appears to be most damaging in the Karragullen-Pickering Brook area.

JORDOVIĆ (M.). **Ispitivanje šarke na Šljivi.** [Investigation of Plum pox.]—*Zasht. Bilja* (*Plant Prot., Beograd*), 1957, 39–40, pp. 13–22, 1957. [English summary.]

Grafting, budding, and inoculation experiments on 28 plum vars. at Novi Pazar, Yugoslavia, with plum pox virus [**37**, p. 92] indicated a varied reaction to the virus. Crvena Ranka and Imperial Épineuse proved the most susceptible, reacting with pronounced leaf symptoms; these differed in intensity with each variety. Monarch and Washington had smaller spots than the others. Ring spots and chlorotic spots were the prevalent symptoms except on President, which developed vein-banding. Metlaš and Magna Glauca were moderately resistant; no var. proved to be a symptomless carrier or resistant.

CAPORALI (L.). **Anomalies structurales provoquées par le *Taphrina deformans* (Berk.) Tul. sur les jeunes rameaux de *Prunus persica* L.** [Structural anomalies induced by *Taphrina deformans* (Berk.) Tul. on young branches of *Prunus persica* L.]—*C. R. Acad. Sci., Paris*, **246**, 22, pp. 3180–3182, 10 fig., 1958.

A description is given of the mode of tumour formation by *T. deformans* in the cortical parenchyma and pith of young peach branches, which are attacked at the base of the tips. Hypertrophied cells attain 2–3 times the normal diam. Mitoses occur in all directions within the hypertrophied tissue giving rise to elements which grow and become hypertrophied in turn; the sinuous lines of the latter break up the

rudimentary parenchyma, producing immense lacunae on their passage to the exterior. Such is the origin of the large tumours that thicken the stem.

Scattered nodules, composed of small, actively dividing cells, appear in the mass of the tumour parenchyma and are soon surrounded by a halo of new elements which extend and join those of the parenchyma. Subsequently a few tracheids may be differentiated in the interior of some of the nodules; certain cells expand and elongate, following the length of the branch and developing radiate lignifications. Around them is a layer of undifferentiated cells which continue to divide and produce new elements towards both the interior and exterior. In this way are formed small, rudimentary vessels, dispersed within the tumour tissue.

In the vascular zone the structural changes are less apparent than in the cortex, being confined to the areas directly invaded by the hyphae; certain cells elongate, expand slightly, and sometimes divide, imparting an irregular aspect in comparison with the healthy tissue. On one side of the most misshapen zones the vascular bundles are pushed outwards, deforming the contour of the annual rings. The vessels become irregular and are often more dilated than healthy ones.

At the growing point the mycelium spreads up to the zone of differentiation of the medullary cells. The structural anomalies are accompanied by important cytological modifications, to be described later.

ENGLISH (H.). Fall applications of ziram and ferbam effectively control Peach leaf curl in California.—*Plant Dis. Repr.*, **42**, 3, pp. 384–387, 1958.

Late autumn applications of zerlate and fermate at the University of California, Davis, in 1953–4, proved the best of several organic fungicides tested for the control of peach leaf curl (*Taphrina deformans*) [37, p. 93], but all were at least as effective as Bordeaux mixture and non-phytotoxic. Adhesive oils did not significantly increase the efficiency of any of the compounds. Their ability to control *Coryneum beijerinckii* [*Clasterosporium carpophilum*] also, as is done by Cu compounds [27, p. 75], remains to be established.

HEYNS (A. J.). Guard against silver leaf.—*Fmg in S. Africa*, **33**, 10, pp. 34–37, 5 fig., 1958.

The symptoms and control of *Stereum purpureum* on peach [35, p. 163] in Cape Province are briefly described.

GUBA (E. F.). Pertinent aspects of the infection cycle and control of the Peach canker pathogen, *Fusicoccum amygdali*.—*Plant Dis. Repr.*, **42**, 4, pp. 481–492, 5 fig., 1 graph, 1958.

Investigations at Massachusetts Agricultural Experiment Station showed that rainfall and temperature are closely correlated with the progress of peach canker (*Fusicoccum amygdali*) [cf. 36, pp. 196, 411]. Infection begins in late summer at the time of enlargement of the axillary fruit buds and continues to develop until checked by cold weather. The fungus is a wound parasite and first enters the bud itself, later spreading into the bark round the nodes. The majority of cankers are in the upper part of the shoots. Pycnidia sporulate abundantly in the cankers. Conidia failed to germinate in 14 days at 40° F., but did so in 4 days at 50°; below 50° growth of the pathogen is very slow. Control is essentially based on preventing autumn infection, and a spraying schedule suitable for the area is given.

MELIK-КНАСНАТЯН (J. G.). Материалы по изучению дырчатой пятнистости косточковых плодовых пород Армянской ССР. [Materials from the study on shot hole of stone fruit in the Armenian S.S.R.]—*Nauch. Trud. erevansk. Univ., Ser. biol. Sci.*(6), **54**, 1, pp. 113–126, 1956. [Armenian summary. Received June 1958.]

detailed survey, by the Fruit Growers' Institute of the Academy of Science in

1953–55, of the 16 districts of the Armenian S.S.R. showed an increase of *Clasterosporium carpophilum* [map 188] on stone fruit in the last 10 yr. Tests on apricot showed only Erevan to be markedly resistant.

VÖRÖS (J.). **A trichothecin antibioticum alkalmazása Meggymonília ellen.** [Trichothecin as an antibiotic against *Monilia* of the Sour Cherry.]—*Növénytermelés*, **6**, 1, pp. 67–70, 1957. [Russian and English summaries.]

At the Agricultural Technical Institute, Eger, Hungary, and in field experiments in the Eger and Derekegyház districts the action of crude trichothecin (from *Trichothecium roseum*) against *M. [Sclerotinia] laxa* on sour cherry [cf. **36**, p. 197] was studied; a conc. of 2.25 units/ml. inhibited the growth of the fungus *in vitro*, and even at 100 had no injurious effect on the flowers. In the field sprays of 50 units/ml. reduced infection on cherry flowers by 70–95%.

GEARD (I. D.). **Septoria leaf spot of Black Currants.**—*Tasm. J. Agric.*, **28**, 3, pp. 226–232, 3 fig., 1957.

This further contribution on the control of *Mycosphaerella ribis* [cf. **35**, p. 689] includes detailed results of analyses for vitamin C content during the 1955–57 trials. These indicate no important reduction in vitamin C content of processed fruit as a result of Bordeaux sprays, so that there was no objection, pending further investigation, to their use. Good control was obtained with Bordeaux green tip spray followed by cover sprays of Bordeaux or thiram, the first named being essential.

TAYLOR (J.). **The Blueberry stem canker disease caused by Botryosphaeria corticis (Demaree and Wilcox) Arx and Muller**—*Diss. Abstr.*, **17**, 11, pp. 2371–2372, 1958.

In studies on the causal fungus of stem canker of cultivated blueberries [*Vaccinium*], *B. corticis*, growth was most satisfactory on oatmeal agar, the opt. temp. was 28° C., and light was essential for sporulation, which reached a max. in 14 days. Three groups were distinguished among the isolates; group O showed aversion with + and –, while the + and – stimulated each other. Less vigorous colonies than the original wild isolates were obtained from monoconidial pairings of + and –.

In N. Carolina the infection period of *B. corticis* was from Apr.–Aug. Both perithecia and pycnidia were present in cankers, the former predominating. Mycelial inoculations on unwounded greenhouse plants were unsuccessful. With conidia small lesions 2–3 mm. diam. were obtained after 3 months.

Stem canker symptoms were compared with those of *Septoria albopunctata* cankers, an undescribed stem and leaf fleck (*Gloeosporium minus*), and stem blight due to an undescribed *B. sp.*

MOORE (M. H.). **The incidence and control of cane spot (Elsinoe veneta (Burkh.) Jenk.) on Loganberry.**—*J. hort. Sci.*, **33**, 2, pp. 96–107, 1958.

Infection of loganberry by *E. veneta* [**34**, p. 796] is slightly different from that in the raspberry [**37**, p. 201], being confined at first to leaves on the fruiting laterals near the distal cane lesions. Spray treatment must protect the young leaves and canes rather than attack the ascocarps by a very early application.

Trials at East Malling over a number of years showed the best spray programme to consist of 4–6–100 Bordeaux mixture applied pre-blossom followed by a colloidal Cu preparation (0.025% Cu) applied between petal fall and ripening. The addition of 0.75% by volume of cotton seed oil reduces the risk of Cu injury. When the young canes were tied above the fruiting canes rather than below them a great increase in crop was obtained, even though they were rendered more susceptible to Cu damage in the succeeding year.

COLLINS (W. B.) & MORGAN (G. T.). **Green petal of Strawberry in New Brunswick.**—*Plant Dis. Repr.*, **42**, 3, pp. 339–341, 1958.

The occurrence of aster yellows virus in strawberry plantings in New Brunswick, Canada [cf. **37**, p. 97] since 1953 indicates the increasing seriousness of this disease. The spring infection in the bearing year, though less evident, is more damaging than that of the previous planting year. Senator Dunlop, which is commonly planted, is more susceptible than Sparkle and Catskill, but native stock is more tolerant than that which is imported or virus free.

BOLTON (A. T.). **Control of Strawberry foliage and fruit diseases.**—*Rep. Quebec Soc. Prot. Pl.*, **39** (1957) pp. 68–70, 1958.

The results are presented of spraying trials with dithane, manzate, tricop, zerlate, and vancide carried out by the Canada Dept Agric., Ottawa, in 1954–56 against strawberry leaf spot [*Mycosphaerella fragariae*: cf. **35**, p. 420], leaf scorch [*Diplocarpon earlianum*: cf. **33**, p. 468], and *Botrytis* fruit rot [*B. cinerea*: cf. **35**, p. 419]. The use of an efficient fungicide (4 applications/year), though giving no marked increase in the 1st yr.'s crop, increased 2nd yr. yields by 2½ times, making a second harvest from the same plantation possible, and obviating annual replanting.

TILL (B. B.). **Experimental control of Strawberry mildew in Cheddar.**—*Plant Path.*, **7**, 1, pp. 30–31, 1958.

In a spraying trial in the Cheddar area of Somerset in 1956, 2-yr.-old Royal Sovereign strawberry plants treated on 1 May, when the first flowers were opening, 16 May, at full flower, and 31 May, at full petal-fall, when the fruits were swelling, with 0.5% griseofulvin (50% wettable powder), griseofulvin (as before)+1% by vol. of glycerol, 5% griseofulvin dust, dinitrocaprylphenyl crotonate (1 lb. of a 25% wettable powder/100 gal.), or 0.15% captan (3 lb. of 50% wettable powder/100 gal.), all sprays + wetter, or left unsprayed, gave, respectively, on 13 June, 25.3, 22.6, 50.5, 13.5, 35.5, and 48% fruits affected by *Sphaerotheca humuli* [**36**, p. 705].

The incidence of mildew on both leaves and fruit was significantly less than in the controls with the dinitrocaprylphenyl crotonate, captan, and griseofulvin sprays.

MERLE (P.), CUILLE (J.), & DE LAROUSSILHE (F.). **Une campagne de lutte contre Cercospora au Cameroun.** [A campaign for the control of *Cercospora* in the Cameroons.]—*Fruits d'outre mer*, **13**, 4, pp. 143–158, 14 fig., 10 graphs, 2 maps, 1958.

As a result of a widespread outbreak of *Cercospora* [*Mycosphaerella musicola*: cf. **36**, p. 383; **37**, p. 492] on Gros Michel bananas in the French Cameroons in 1956 [cf. **36**, p. 638], control operations based on meteorological forecasts of conditions favouring infection were carried out from the air and on land in 1957 over a large part of the affected area. About 4,800 ha. of homogeneous plantations (bananas only) were treated from the air, and 7,000 ha. (5,000 ha. of mixed plantations, the rest bananas only, but unsuited to treatment from the air) were treated by knapsack spraying-machines. During periods when severe infection is forecast treatment is fortnightly, otherwise once in 3 weeks suffices. In 1957 the principal period of infection was Apr.–Nov., and 13 applications were made in all.

Aerial treatments were with 1.5 kg. of Cu concentrate (17% Cu) in 10 l. of oil, viscosity 4–7° E at 20° C., aromatic content under 12%, and acidity under 0.19 mg. of K free from S [**37**, p. 448].

The ground treatments were given with an oily mixture containing 1.5% copper oxychloride and having a viscosity of about 5° E at 25° C. Gradually, however, these were abandoned in favour of 'high-altitude' aerial treatment, flying above

the trees (at about 40–50 m.), and applying a 'fog' with particles 300–500 μ diam. (A preliminary experiment with a helicopter showed that it is inadvisable to risk a low-altitude machine in a thickly wooded area, movement below tree-top level being very restricted).

The results achieved by the aerial treatment of the monocrop plantations were very satisfactory, in view of bad condition of these at the beginning of the year. By the end of Nov. the efficacy of the treatment was estimated at 80%, amply sufficient to protect the crop.

The high-altitude fogging of the mixed plantations gave very similar results, and by Nov. was 60% effective, which was very good in view of the lateness in starting the treatment and the degree of infection present. Comparative ground treatment (20 ha. of monocrop plantation), repeated every fortnight from June to Nov., also gave very satisfactory results.

JOHNSTON (A.). **Pineapple fruit collapse.**—*Malay. agric. J.*, **40**, 4, pp. 253–263, 2 pl., 1957. [Received May 1958.]

Pineapple fruit collapse [16, p. 657; 33, p. 523], first observed in Malaya in Johore in 1935, was found in the south of Perak in 1956 [36, p. 457], but is not yet known elsewhere in Malaya. In Perak the losses caused have been negligible, but in Johore they have attained 40%. Incidence in 11 agronomic and other experiments carried out between 1951 and 1956 indicated a wide variation, but the mean figure of 10% is probably a fair estimate of recent losses on large estates.

An apparently healthy fruit, just before it is due to assume an orange colour and turn ripe (after which stage resistance develops), becomes a soft, oozing mass of rotten tissue, held together by the somewhat firmer skin. The disease affects the whole fruit within a week after infection. The causal organism is a strain of *Erwinia carotovora* [cf. 36, p. 772]. The disease is worst in young plantings and under high humidity. Nutrient status had no apparent effect, but the var. Sarawak appeared to have considerable resistance, while Singapore Spanish, Selangor Green, and Mauritius were all susceptible. It seems likely that spread usually takes place by means of air-borne bacteria from plants affected by fruit collapse or heart rot [loc. cit.] and at present control must depend solely on the safe disposal of affected fruit, especially during the off-seasons and at the beginning of the main fruiting periods. Weekly spraying with streptomycin gave some control, but is not economic.

ARAGAKI (M.) & GOTO (S.). **Mango anthracnose control in Hawaii.**—*Plant Dis. Rept.*, **42**, 4, pp. 474–475, 1 fig., 1958.

At the University of Hawaii, Honolulu, anthracnose (*Colletotrichum gloeosporioides*) [*Glomerella cingulata*: cf. 37, p. 98] on mango was well controlled by 3 lb. captan/100 gal. applied weekly in the wet season and biweekly thereafter, 9 applications in all. Zineb (2 lb./100 gal.) gave some control, but was much less effective.

EHRENREICH (J. H.). **Effects of certain fungicides on seed germination and seedling establishment of range plants.**—*J. Range Mgmt.*, **11**, pp. 22–27, 1958. [Abs. in *Chem. Abstr.*, **52**, 9, col. 7603 i, 1958.]

Orthocide 75 [captan] was the most effective fungicide tested in Missouri against pre-emergence losses, especially those caused by *Pythium debaryanum*. Warm-season grasses derived more benefit from the treatment than did cool-season species or legumes. Arasan was the most injurious to stored seed.

MEINERS (J. P.). **Studies on the biology of *Tilletia bromi-tectorum*.**—*Phytopathology*, **48**, 4, pp. 211–216, 3 fig., 1958.

A detailed account is given from the Washington Agricultural Experiment Stations, Pullman, of the widespread smut on *Bromus tectorum* in the Pacific Northwest of the

U.S.A., previously identified as *T. caries* [29, p. 357], but now distinguished by its larger spores and restricted host range (confined to *B. tectorum*) as *T. bromi-tectorum* (*An. Jard. bot. Madr.*, **3**, pp. 279-284, 1943).

SOLHEIM (W. G.). ***Puccinia poae-nemoralis* Otth. on *Phleum pratense* L. and other grass hosts in Wyoming.**—*Plant Dis. Repr.*, **42**, 4, p. 533, 1958.

P. pratense is apparently a new host for this rust. Other grass hosts in the State are listed.

BOVEY (R.). **Une anomalie des fleurs du Trèfle causée par un virus transmis par des cicadelles.** [A floral anomaly of Clover caused by a virus transmitted by leaf-hoppers.]—*Rev. rom. Agric.*, **13**, 12, pp. 106-108, 3 fig., 1957.

White clover (*Trifolium repens*) in Switzerland, especially in the French-speaking regions and the Ticino, is frequently affected by phyllody; the diseased plants gradually degenerate, and in areas where the condition predominates this clover is tending to disappear. *T. pratense* is also affected, but to a less extent.

In an affected field of white clover near Changins, in June 1957, the author collected about 50 individuals of the most prevalent leafhopper, *Euscelis plebejus* [35, p. 480], which were left for 10 days on healthy white clover plants in cages. Four weeks after the start of this experiment the plants displayed typical early symptoms of phyllody. Other experiments showed *Aphrodes bicinctus* also to be a vector. The disease does not appear to be of any great economic importance.

OSTAZESKI (S. A.). **The initial symptoms of Red Clover root rot ; associated fungi, and the effect of inoculation methods on their pathogenicity.**—*Diss. Abstr.* **17**, 11, pp. 2396-2397, 1957.

In the early stages of red clover root rot [35, p. 192] greenhouse-grown plants at the University of Illinois were invaded by nematodes and a mycorrhizal fungus 10 days after planting. After 18 days lesions were found in stained roots, and after 45 days dark spots and killed rootlets were visible in unstained specimens. Most plants had no rootlets on the upper part of the taproot after 72 days. These symptoms were similar to those observed in the field, but in late Aug. crown rots and a decay of the outer phloem were found which did not occur in the greenhouse. The crown rots were unimportant but phloem decay increased as the season progressed.

Fungi were found associated with the crown rots, the outer phloem decay, and in the cortex and epidermis of noncambial roots, but not with brown deposits in the xylem adjoining the remains of a dead or dying lateral root. Phloem decay was separated from healthy tissue by fresh meristems.

The most frequent isolates were *Fusarium oxysporum*, *F. solani*, and *Leptodiscus terrestris* [34, p. 229]. Less frequent were *Pythium* spp., *Fusarium* spp., *Pyrenochaeta terrestris*, *Rhizoctonia* [*Corticium*] *solani*, and *Epicoccum nigrum*. In inoculation tests only *L. terrestris*, *Pythium* sp., and *C. solani* were pathogenic.

When soil was inoculated with whole oats or maize-meal sand on which *F. solani*, *F. oxysporum*, or *Gliocladium roseum* had been cultured, all 3 were pathogenic. When mixed with soil as spore suspensions, blended tube cultures, or soil substrate inoculum they were usually non-pathogenic. Some pots containing whole oats were overgrown by *Oedocephalum* sp. which had a deleterious effect on the clover seedlings. When inoculated to seedlings in an oat-soil mixture it caused stunting and chlorosis and finally, death. In other pathogenicity tests, root rot was caused by *F. solani*, *F. oxysporum*, *G. roseum*, and *Aspergillus* sp., but was most severe with the air-borne fungi colonizing the potato dextrose agar used on the controls.

Plants grown in soil subjected to a long period of sterilization were more stunted than those grown in soil treated for shorter periods. There was a significant interaction between the time of sterilization and the level of organic matter.

LEACH (C. M.). **Sclerotia of *Typhula idahoensis* found mixed with Idaho-grown seed of *Trifolium pratense*.**—*Plant Dis. Repr.*, **42**, 3, p. 383, 1958.

The sclerotia of *T. idahoensis* were identified [cf. **19**, p. 434] at the Oregon Agricultural Experiment Station in red clover seed from Idaho. They had originated from a crop overwintered in windrows and threshed the following spring. This questions the validity of some of the earlier European reports on the occurrence of sclerotia of *T. trifolii* in clover and lucerne seed, based on macroscopic characters of the sclerotia only.

La producción de Alfalfa. Variedades, siembra y utilización forrajera. [The production of Alfalfa. Varieties, sowing, and forage utilization.]—*Foll. Divulg. Sec. Agric. y Ganad., Oficina de Estudios Especiales, México*, **25**, 57 pp., 21 fig., 1957. [English summary.]

This pamphlet includes descriptions of the most important diseases observed on lucerne in Mexico, comprising common leaf spot (*Pseudopeziza medicaginis*), downy mildew (*Peronospora trifoliorum*), crown and root rot (caused chiefly by *Fusarium oxysporum* and *Rhizoctonia* [*Corticium*] *solani*), and bacterial wilt (*Corynebacterium insidiosum*) [map 67]. Among the less serious are those caused by *Ascochyta imperfecta* [map 263] and *Uromyces striatus* [map 342]. Caliverde has shown more resistance to foliar diseases than any other variety tested.

BRIGHAM (R. D.). **Etiology of and screening methods for *Cercospora* disease of Alfalfa.**—Abs. in *Iowa St. Coll. J. Sci.*, **32**, 2, pp. 141–143, 1957.

Experiments on the selection of lucerne resistant to *Cercospora medicaginis* [cf. **36**, p. 191] showed that typical lesions were produced in 13 days in moist chambers, using mycelial suspensions and infected stems. In the greenhouse addition of 0.1% tween 20 to the inoculum augmented infection with mycelial fragments, but spore suspensions were better. In dew chambers lesions developed best at 70–80° F., excessive moisture reducing the amount of infection. When lucerne, red clover, sweet clover, and Ladino clover were cross-inoculated with isolates of *Cercospora* spp. from the 1st 3 those from lucerne parasitized only lucerne, but those from red clover and sweet clover produced atypical lesions on the other species. Production of viable spores occurred in 6 hr. on infected lucerne stems in moist Petri dishes. Detached lucerne leaves on cotton moistened with distilled water or 2% sucrose were infected by spores within 8 days, and by spore- or mycelial suspensions within 14 days, but with atypical symptoms.

RIBALDI (M.). **Ricerche sul diradamento dei medicai italiani. I. Su una caratteristica alterazione di natura batterica dell' apparato radicale dell' Erba medica (*Medicago sativa* L.).** [Research on wilt of Italian Lucerne varieties. I. On a characteristic change of bacterial nature of the root of Lucerne (*Medicago sativa* L.).]—*Phytopath. Z.*, **31**, 4, pp. 337–366, 11 fig., 1958. [44 refs. English and German summaries.]

The results of further investigations into a bacterial wilt of lucerne [cf. **35**, p. 372] in the province of Verona, Italy, during 1955–56 are reported. A detailed description is given of 2 new bacteria, *Flavobacterium vasculorum* Ribaldi and *Aerobacter luteum* Ribaldi, which were isolated from the roots of 1- and 2-yr.-old plants grown in irrigated fields. Other bacteria, not so frequently isolated from the roots and apparently similar to *F. vasculorum*, are yet to be studied. *Fusarium oxysporum* was always isolated from the affected tissues of severely injured plants [cf. **37**, p. 416].

The bacteria, which are normally saprophytic, penetrate into the vessels through wounds, generally caused by frost, establish themselves in the innermost part of the xylem, and produce gummose secretions in the vascular tissue.

These symptoms could be artificially induced by inoculating the bacteria into cuts on the roots of 5-month-old plants. Without wounding, the bacteria gave negative results.

The author concludes that the etiology of the disease is complex, since its development varies according to cumulative and inter-dependent biological and environmental factors. However, he assumes that the wilt is primarily caused by bacterial toxins and the gummose secretions they cause, leading to the occlusion of the vessels and a disturbance of the water equilibrium, especially at higher temps., thus decreasing the natural resistance of the host and rendering it more susceptible to penetration by root fungi of the *Fusarium* type.

SHARMA (O. P.) & MERH (J. L.). **A leaf-spot disease of *Echinochloa colonum* Link due to *Piricularia* species.**—*Curr. Sci.*, **27**, 3, pp. 96–97, 1958.

This is the first record of *Piricularia* sp. on *Echinochloa colonum*, a weed of rice fields, at Indore. Conidia measure $16.74-27.9 \times 7.44-11.16$ (21.3×9.28) μ . The mature spots on the leaves are circular or elliptical, 1–6 mm. diam.

PUTT (E. D.). **Note on resistance of Sunflowers to leaf mottle disease.**—*Canad. J. Pl. Sci.*, **38**, 2, pp. 274–276, 1958.

In a varietal trial at Canada Dept Agric., Morden, Manitoba, 40 vars. and lines of sunflower were grown in soil infested with *Verticillium albo-atrum* [37, p. 52]. A low percentage of leaf mottle was recorded on CM 7, CM 5, and CM 6. Preliminary results indicated the complex nature of the inheritance of resistance to this disease. The above vars. were also resistant to 'yellows', prevalent on sunflowers in Manitoba in 1957, believed due to aster yellows virus.

VELASCO (J. R.). **Copper deficiency in Bicol soil as a possible cause of the cadang-cadang of Coconut.**—*Philipp. Agric.*, **41**, 3, pp. 157–170, 7 fig., 1957.

After reviewing the symptoms of this disease [36, p. 695 *et passim*] and examining a number of features which throw doubt on its suggested virus nature the writer notes its association with soil types which have been indicated by analysis and the reaction of certain plants, particularly tomatoes, to be deficient in Cu. The suggested relationship between the disease and soil Cu content is considered deserving of further investigation.

HUSSAIN (F.). **Occurrence of Date Palm inflorescence rot in Iraq.**—*Plant Dis. Reptr.*, **42**, 4, p. 555, 1958.

At the Abu Ghraib Agricultural Experiment Station, Baghdad, Iraq, rotted inflorescences of the date palm yielded isolates of *Mauginiella scaettae* [5, p. 422; 37, p. 244]. The disease is most prevalent in the humid district of Basrah, near the Persian Gulf, losses occasionally reaching 90%.

GREGOR (J. W.). **Director's report. Potatoes.**—*Rep. Scot. Pl. Breed. Sta.*, 1958, pp. 11–17, 1958.

In further work at this Station at Roslin, Midlothian, on field resistance to potato blight (*Phytophthora infestans*) [cf. 36, p. 660], most commercial vars. were classified as susceptible, i.e. they bore active stem and leaf lesions but remained alive. A few reputedly resistant vars., such as Champion, Ackersegen, Voran, and Carmen, were classified as moderately resistant, i.e. they bore larger lesions than highly resistant vars., but these often spread slowly.

Potato plants experimentally infected with the paracrinkle strain of potato virus S [cf. 36, pp. 419, 812] differed widely in their reactions. Some vars. remained apparently symptomless, while others were stunted and developed malformed leaves with chlorotic and necrotic areas. Tuber yields from the more severely affected plants were much reduced, and many tubers displayed cracks and internal necroses.

There was no apparent natural transmission from King Edward to commercial vars., but a high rate from Arran Victory of the strain that it carries. A further collection of South American potato material lacked resistance to virus S.

It was established that in *Solanum acaule*, immune, necrotic, and tolerant reactions to virus X are determined by an allelomorphous series of 3 major genes. Experimental breeding showed that necrotic response to virus Y in *S. demissum* is always accompanied by a necrotic reaction to virus A. The relationships established between the genes and the viruses suggested that virus Y and virus A are related.

KELLER (E. R.). **Das schweizerische Richtsortiment im Kartoffelbau 1957/58.** [The Swiss official variety list of Potatoes 1957/58.]—*Mitt. schweiz. Landw.*, **6**, 1, pp. 4–10, 1958.

In this tabulated appraisal of 18 recommended potato varieties their reactions to haulm and tuber blight (*Phytophthora infestans*) [36, p. 55], wart [*Synchytrium endobioticum*: cf. loc. cit.], and various virus diseases [36, p. 122] are indicated.

ARZUMANYAN (A. A.). О болезнях Картофеля в Степанаванском районе Армянской ССР. [Potato diseases in the Stepanavan district in the Armenian S.S.R.]—*Nauch. Trud. erevansk. Univ.*, Ser. biol. Sci. (6), **54**, 1, pp. 127–139, 1956. [Armenian summary. Received June 1958.]

Up to 27.6% of the damage and loss by disease is due to *Phytophthora infestans*, up to 22.4% by *Macrosporium* [*Alternaria*] *solani* [map 89], and 17% by virus diseases. Diseases of the tubers are caused by *Fusarium solani*, complex bacterial infections, *Actinomyces* [*Streptomyces*] *scabies*, and *Corynebacterium sepedonicum* [map 20]. The mechanical square-hole system for planting potatoes, in place of the old furrow method, considerably decreased the extent of *P. infestans* and virus diseases.

GRAM (E.). **Distribution and prevalence of Potato virus diseases in Denmark.**—*F.A.O. Pl. Prot. Bull.*, **6**, 6, pp. 81–84, 1 graph, 1 map, 1958.

The author, of the State Phytopathological Research Station, Lyngby, Denmark, discusses the influence of local conditions on the incidence of potato virus diseases in Denmark [36, p. 117], the effect of these diseases on yield, and the prevalence of potato virus X locally. In 1950 healthy Bintje potatoes were distributed to 355 farms throughout the country and were grown for 5 years without roguing. The first virus disease to appear was rugose mosaic [potato virus Y, often in combination with potato virus X] which is also common in certain varieties in Denmark. In the 3rd yr. leaf roll virus became widespread, though rugose mosaic was predominant, especially in samples from the islands. Infection with these combined viruses could cause up to 62% reduction in yield. After the sudden increase in 1952 the disease incidence remained in most cases fairly constant, though variable in some areas.

MARTIN (C.). **Anomalies de synthèse des anthocyanes dans le germe de Pomme de terre atteinte de maladies à virus.** [Anomalies of anthocyanin synthesis in the Potato sprout attacked by virus diseases.]—*C. R. Acad. Sci., Paris*, **246**, 19, pp. 2790–2792, 1 graph, 1958.

In the course of a study on the accumulation of phenolic compounds derived from caffeic acid in virus-diseased potatoes very remarkable anomalies of pigmentation in sprouts 3–4 cm. in length of plants infected by potato viruses X and Y were observed under both diffused natural and fluorescent light. Instead of the pink, red, or purple coloration (according to the variety) of healthy sprouts, there was a medley of irregular patches, some pigmented and others not. The occurrence of more than 1 virus in a sprout may inhibit pigmentation altogether.

GOVIER (D. A.). **The preparation of antisera to Potato virus X.**—*Rep. Scot. Pl. Breed. Sta.*, 1958, pp. 77–81, 3 graphs, 1958.

In attempts to prepare antisera to potato virus X with a high concentration of strain-specific antibodies 2 methods were devised. In one, rabbits were given 2 intravenous injections of partially purified virus suspension, the 2nd (4 ml.) 4 weeks after the 1st (2 ml.). In the other, the partially purified virus suspension was emulsified in an equal vol. of 'Difco bacto-adjuvant complete' (Freund), and 1 ml. of the emulsion was injected intramuscularly into both hind legs of the rabbit. Compared with the usual intravenous technique, these methods gave a higher conc. of antibody for each unit of antigen injected, most antibody per unit antigen being produced when the antigen is injected at low conc.

BENSON (A. P.) & HOOKER (W. J.). **Recovery of virus X from 'immune' Potato varieties (*Solanum tuberosum* L.).**—Abs. in *Amer. Potato J.*, **35**, 2, p. 421, 1958.

Potato virus X was recovered from the potato vars. S.41956, Saco, and Tawa, considered to be immune, after these had been grafted with *Datura stramonium* var. *tatula* and virus X-free clones of Erlaine potato, which were subsequently inoculated with the virus or with Irish Cobbler scions infected with virus X.

EASTON (G. D.), LARSON (R. H.), & HOUGAS (R. W.). **Immunity to Potato virus Y.**—Abs. in *Amer. Potato J.*, **35**, 2, p. 423, 1958.

Seven tuber clones and 1 selection from true seed of *Solanum stoloniferum*, 1 tuber clone and 2 seed selections of *S. antipoviczii*, and 1 seed selection of *S. tlaxcalense* were immune from potato virus Y when inoculated mechanically, by aphids, or by grafting at the University of Wisconsin. Clonal tuber lines of 8 spp. of *S.* (listed) and *S. stoloniferum* were infected by mechanical inoculation. Of 22 hybrids tested, 13 were immune from mechanical and graft inoculation and 6 were susceptible to mechanical inoculation. There were 3 types of reaction to the virus: (1) systemic infection with mosaic symptoms, the virus being recoverable; (2) hypersensitivity, evidenced by local lesions and/or necrotic reactions, the virus being recoverable from a few plants only; and (3) immunity, no visible reaction, the virus not recoverable.

With a single exception the passage of the virus through scions of immune *Solanum* spp. and species hybrids, grafted between susceptible tomato or tobacco scions and stocks, always occurred downwards. The virus was not recoverable from these immune intermediate scions, whether by the 'spot necrosis' reaction in tobacco, by a graft test using lateral bud growth as scions, or by means of aphids.

[Much of this work is also summarized by EASTON (G. D.), *Diss. Abstr.*, **17**, 11, p. 2370, 1958.]

BAGNALL (R. H.) & BRADLEY (R. H. E.). **Resistance to virus Y in the Potato.**—*Phytopathology*, **48**, 3, pp. 121–125, 1958. [24 refs.]

To investigate, at Fredericton, New Brunswick, Canada, the comparative merits of certain tests for resistance to potato virus Y [**35**, p. 481; **36**, p. 723, *et passim*] a field experiment was laid down in each of the years 1951–53, infection being secured in the 1st yr. of each trial by interplanting 10–15 vars. with infected Green Mountain. In the 2nd yr. tubers from the 1st were replanted, but the infector rows were omitted. The 1953 experiment was continued with non-rogued stocks until 1957, the tubers being replanted each year, to note cumulative effects.

Plants reacting with mosaic symptoms, especially Craigs Defiance and Green Mountain, were susceptible to field infection, though Canso, Irish Cobbler, and seedling F 451 showed some resistance. Varieties developing necrotic symptoms, however, were resistant, seedling F 4519 and Kennebec outstandingly so. In the 3rd experiment vars. with mosaic symptoms became progressively more infected

over the 4 years, whereas in those with necrosis the virus was self eliminating, since they tended to die prematurely.

In greenhouse trials with *Myzus persicae* as a vector, aphids placed on upper leaves of healthy 2-8-week-old plants caused more infection than those on middle or lower leaves; ageing of the plant had little effect on infection via the upper leaves though it reduced it when the lower leaves were inoculated. Varietal resistance to aphid inoculation in the greenhouse, however, was often contrary to the field result. Virus Y was more readily obtained by aphids from upper leaves of infected plants than from the lower, and vars. with mosaic symptoms had a higher virus content and were a better source of virus than those that were necrotic.

It became apparent that several American vars. including Katahdin, Kennebec, and Warba are field resistant to the strain of potato virus Y commonly found in eastern Canada, and a number of other vars. show the necrotic reaction, though the relation between this response and resistance is still uncertain.

AUGIER DE MONTGREMIER (HÉLÈNE) & DEVERGNE (J.-C.). **Recherches sur les propriétés fondamentales d'un virus de la Pomme de terre récemment signalé en France permettant de l'identifier au virus M de Larson.** [Researches on the fundamental properties of a Potato virus recently reported in France which permit its identification with Larson's virus M.] —*C. R. Acad. Agric. Fr.*, **44**, 2, pp. 104-110, 1958.

The new virus recently isolated from Ratte potato plants in Brittany [37, p. 110] causes a conspicuous mosaic in this variety, with a slight, soft rolling of the leaves near the top. Industrie also reacts with a conspicuous mosaic and a similar rolling. Because of this latter symptom, in which the leaf becomes spoon shaped, the virus was provisionally referred to as 'virus F.C. (feuille en cuillère)'. In Fin de Siècle and Ackersegen the mosaic is less apparent and the leaflets are slightly curved in near the apex and not markedly crimped. Ratte did not contain X, Y, S, or A viruses. Industrie carried S and A.

White Burley tobacco and *Datura stramonium* were immune from virus F.C., while Marmande and Merveille des Marchés tomatoes were highly susceptible. The virus is transferable mechanically to potato and tomato. These results resemble those obtained by Larson with potato virus M [36, p. 779; 37, p. 502]. *D. metel* also reacted to leaf inoculation with virus F.C. similarly to virus M. The virus was inactivated at 65° C., and it bore a close antigenic relationship to virus M, from which it is concluded that the 2 are probably identical.

ROBINSON (D. B.) & CAMPBELL (J. E.). **Observations on purple top of Potatoes in Prince Edward Island.**—*Plant Dis. Repr.*, **42**, 3, pp. 337-338, 1958.

These observations by the Canada Dept Agric. on potato purple top caused by aster yellows virus [34, p. 54] showed that the disease reduces yields in the season of infection and in the first year when infected tubers are used for seed, but that the effect on tubers did not persist for more than 1 yr. Grading out the small tubers from purple top plants tends to eliminate the disease in seed stocks.

MACARTHUR (A. W.). **A note on the occurrence of Cucumber mosaic virus in Potato.**—*Rep. Scot. Pl. Breed. Sta.*, 1958, pp. 75-76, 1 pl., 1958.

The presence of cucumber mosaic virus in a potato seedling in Scotland [36, p. 661] was confirmed by cross-protection tests in *Zinnia*. No evidence was obtained that the virus was transmitted through the tuber, and the disease is unlikely to prove of economic importance [cf. 36, p. 176].

HODGSON (W. A.). **Growth of four races of *Phytophthora infestans* (Mont.) de Bary in synthetic media.**—*Canad. J. Pl. Sci.*, **38**, 2, pp. 145-154, 1958. [30 refs.]

An abstract of this paper has already been noticed [37, p. 53]. It is concluded that

the nutritional requirements of a number of isolates of the same race should be studied before differences between single isolates are regarded as race characteristics.

GALINDO (J.) & GALLEGLY (M. E.). **Compatibility types in *Phytophthora infestans*.**—Abs. in *Amer. Potato J.*, **35**, 2, p. 423, 1958.

By tracing the antheridial and oogonial hyphae [cf. **9**, p. 684; **36**, p. 549] it was established that the 2 mating groups in *P. infestans* [**37**, p. 503] differ in compatibility but not in sexual morphology. Each isolate, when paired with an isolate of the opposite type, has the ability to form antheridia and oogonia, but is normally self-sterile. An isolate may thus act as either male or female, depending on the pairing. Therefore functional heterothallism exists in the species.

TOXOPEUS (H. J.). **Note on the variation in expression of hypersensitivity to *Phytophthora infestans* in Potato seedlings.**—*Euphytica*, **7**, 1, pp. 38–40, 1958. [Dutch summary.]

At the Institute of Agricultural Plant Breeding, Wageningen, when potato seedlings from crosses involving a gene (R) [**37**, p. 503] for hypersensitivity-resistance were sprayed with swarmspores of *P. infestans*, the susceptible plants became thickly covered with conidiophores, while the resistant usually did not, though developing necrosis.

Epidemiology of Potato blight.—*Nature, Lond.*, **179**, 4554, pp. 294–295, 1957.

At a symposium arranged by the British Mycological Society N. F. ROBERTSON spoke on work at Cambridge on the relation between stem lesions of *Phytophthora infestans* and first infections [**36**, p. 54]. J. M. HIRST described the early phases of blight epidemics at Rothamsted [**36**, p. 814]. J. GRAINGER advanced an explanation of blight phenology based on host physiology and weather influence [**36**, p. 604]. P. M. BOURKE gave an account of the use of synoptic weather charts for forecasting outbreaks [see below]. E. C. LARGE outlined the results of 7 years' work on forecasting in the British Isles by means of the Beaumont rules [**36**, p. 54], and A. E. COX reviewed potato blight control in Canada and the United States [**36**, p. 718].

BOURKE (P. M. A.). **The use of synoptic weather maps in Potato blight epidemiology.**—*Tech. Notes met. Serv. Eire* **23**, 35 pp., 14 maps, 1957. 2s. [26 refs. Mimeographed.]

The synoptic weather situations which lead to the types of weather favourable or unfavourable to potato blight [*Phytophthora infestans*: **37**, p. 105 and above] are described in detail. The principles are then applied to the conditions of the 1956 potato-growing season in the British Isles and N.W. Europe. The conclusions derived from the maps alone were in agreement with the observed appearance and spread of the disease. The value of meteorological charts as a supplement to the different systems in use for forecasting blight periods is further illustrated by a general review of the preceding 4 seasons and by examples referring to Prince Edward Island, Virginia, and S. Chile [**37**, p. 417].

THURSTON (H. D.), KNUTSON (K. W.), & EIDE (C. J.). **The relation of late blight development on Potato foliage to temperature and humidity.**—*Amer. Potato J.*, **35**, 2, pp. 397–406, 4 graphs, 1958. [21 refs.]

In field studies during 1951–54 at the Institute of Agriculture, St Paul, Minnesota, an attempt was made to establish a correlation between the spread of *Phytophthora infestans* in experimental plots of Irish Cobbler (with single inoculated plants as

the source of infection) and the occurrence of favourable periods of temperature and humidity [cf. **36**, p. 120 and above]. Over 56% of the favourable periods coincided with rainy days. In most instances Hyre's moving graph method [**35**, p. 120] would have accurately indicated the periods of spread. Spread was more rapid on silt loam than on peat, but this difference was not attributable to differences in temp. and humidity. It would appear that in regions where primary inoculum occurs sporadically the prediction of blight development by the use of hygrothermographs should be supplemented by surveys to find whether centres of infection are present. In a single comparison race 0 spread more rapidly than race 1 in a similar plot.

AWAN (A. B.) & STRUCHTMAYER (R. A.). **The effect of fertilization on the susceptibility of Potatoes to late blight.**—*Amer. Potato J.*, **34**, 11, pp. 315–319, 1 fig., 1 graph, 1957.

In field and greenhouse experiments at Maine Agricultural Experimental Station Farm, Presque Isle, the effects of various levels of N, P, and K on the susceptibility of Green Mountain potatoes to *Phytophthora infestans* [cf. **4**, p. 377] were compared by removing sample leaves from plants grown on plots of differing nutrient status, placing them under moist conditions at 62–64° F., and inoculating them with a piece of cotton wool, soaked in spore suspension, placed at the tip of each leaflet for 2 days. Susceptibility was estimated from the size of the resultant lesions.

Excessive amounts of N markedly increased susceptibility in the field but not in the greenhouse, possibly because of the greater size and vigour of the field plants or the outbreak of leaf roll which occurred in the greenhouse. There was a marked increase in resistance with every increase of P, which emerged as the most important factor, and likewise, though to a lesser extent, with increased K.

BONDE (R.) & JOHNSON (BARBARA). **Studies on the additive effect of agrimycin on different fungicides in the control of Potato late blight, *Phytophthora infestans*.**—*Plant Dis. Repr.*, **42**, 3, pp. 330–333, 1 fig., 1958.

At Maine Agricultural Experiment Station 10 fungicidal spray mixtures were prepared at 4 different concs. with or without agrimycin 100 (50 p.p.m.) and tested for the control of potato blight on inoculated detached leaves incubated in moist chambers. Agrimycin increased the control of the disease with all the fungicides except manzate and niacide M (manganous dimethyl dithiocarbamate) and reduced the percentage of leaf area killed by the fungus. It did not prevent infection but apparently reduced the growth of the fungus in the leaf.

REDDY (C. S.), ORILLO (F. T.), & GIBE (L. N.). **Spraying to control late blight of Potatoes in the Philippines.**—*Plant Dis. Repr.*, **42**, 3, pp. 334–336, 1958.

It is reported from Los Banos that in experiments with spray mixtures to control *Phytophthora infestans*, very widespread in 1956 in the Philippine Islands, 7 applications at 7- to 10-day intervals of dithane Z-78 (2 lb./100 gals.) or parzate (2 lb.), the best of 9 fungicides tested, gave the highest yields and least blight. Spraying costs and economic returns are tabulated.

MOORE (W. C.). **The breakdown of immunity from Potato wart disease.**—*Outlook on Agric.*, **1**, 6, pp. 240–243, 1 fig., 1957.

After a brief introduction dealing with the control of the spread of *Synchytrium endobioticum* by means of import restrictions, the author discusses the occurrence of new physiologic races of the fungus [cf. **36**, p. 718] in Germany [**37**, p. 304]; Czechoslovakia [**32**, p. 208], Italy [**34**, p. 810], Russia [cf. **36**, p. 120], and Newfoundland [**37**, p. 369].

YOUNG (B. A.) & TOLMSOFF (W. J.). **Current season and residual effects of vapam soil treatments for control of *Verticillium* wilt of Potatoes.**—*Plant Dis. Repr.*, **42**, 4, pp. 437–440, 1958.

In trials at Corvallis, Oregon, conducted over a 3-year period, vapam at 160 or more lb./acre was effective in controlling *Verticillium* wilt of potatoes [36, p. 613], and when blade injected in the soil 6 in. deep at 160, 165, or 190 lb./acre increased the yield by over 5 tons/acre. Lower rates of application were much less effective. Potatoes planted in plots treated the previous year at 190 and 165 lb./acre gave 2½ tons increase in yield. Without a residual effect the treatment is not economic.

BUSCH (L. V.). **Silver scurf of muck Potatoes.**—*Plant Dis. Repr.*, **42**, 4, pp. 441–443, 1958.

The blemishes due to *Spondylocadium* [*Helminthosporium*] *atrovirens* [17, p. 835] are becoming significant when potatoes are washed and sold in polyethylene bags. Trials at Guelph, Ontario, with 21 chemicals showed that only puraseed, semesan bel, karathane, terraclor, and manzate prevented sporulation with a minimum of damage to the 'eyes'.

EICHINGER (A.). **Kartoffelschorf und Oxalsäure.** [Potato scab and oxalic acid.]—*Z. Acker- u. PflBau*, **105**, 4, pp. 451–458, 1 fig., 1958.

This is an intensive study (incorporating some of the results already published by the Bundesministerium für Ernährung, usw., Bonn, 1954) on the relation of the changes induced in the skin of potato tubers by deposits of Ca cations to infection by scab (*Actinomyces*) [*Streptomyces scabies*: see below]. A schedule of soil amendments is recommended, based on the hypothesis that the oxalic acid produced by the plant is the strongest inactivator of these ions. Not only is superphosphate important for tuber and starch production, but it appears to maintain the balance of oxalic acid metabolism. Synthetic fertilizers containing Mg and Na should be excluded, since their ions compete with those of Ca for oxalic acid. It is thought likely that resistance to scab is influenced by the capacity of different varieties for oxalic acid formation.

HOUGHLAND (G. V. C.) & CASH (LILIAN C.). **Some physiological aspects of the Potato scab problem. II. Calcium and calcium-potassium ratio.**—*Amer. Potato J.*, **33**, 8, pp. 235–241, 1 fig., 1 graph, 1956.

Further studies at Beltsville [cf. 35, p. 709] showed that the Ca:K ratio in potato haulms and tubers had no effect on the susceptibility of tubers to scab (*Streptomyces scabies*: cf. *Soil Sci.*, **53**, pp. 481–488, 1952) [33, p. 555 and above], nor was the total Ca content of tubers found to be related to their susceptibility. Owing to differences in the quantities of Ca and K translocated from haulms to tubers these elements are unlikely ever to occur in a 1:1 ratio in the tubers, nor was this ratio, suggested by others as of importance in preventing scab infection, ever found in the haulms.

The periderm of scabbed potatoes contained almost double the amount of Ca found in that of clean tubers, and in potatoes affected by scurf [*Helminthosporium atrovirens*] the proportion was intermediate; P followed a somewhat similar pattern, but the differences were less marked, and with K they were relatively small. The increased Ca in the periderm of scabbed potatoes is regarded as the result rather than the cause of infection.

GUNTZ (M.) & COPPENET (M.). **Essais de traitements contre la gale commune de la Pomme de terre.** [Spray trials against common scab of the Potato.]—*Phytiatric-Phytopharm.*, **6**, 4, pp. 187–195, 1957.

In 1954 near Morlaix, Finistère, in co-operation with the Station Agronomique

de Quimper, France, to control *Streptomyces scabies* [cf. **33**, p. 707] on potato the soil was treated with acid mineral fertilizer, or alkaline mineral fertilizer, or farm manure (40 tonnes/ha.), or none, and then with flowers of sulphur (500 and 2,000 kg./ha.), preparation S (27% Na dimethyldithiocarbamate and 3% Na mercapto-benzothiazolate, at 40,000 l./ha. of a 0.35% solution), 2.5% orthoxyquinoline sulphate at 5 kg./ha. of the pure product, or none. In 1955, the same soil was used again; the plots previously treated with flowers of sulphur received no further treatment, while the other 2 treatments were replaced by sulphur spread in the furrow (500 kg./ha.) and by pentachloronitrobenzene [PCNB] (15% active, used at 100 kg. pure material/ha.).

The only treatments giving results that justified the expense involved were sulphur and PCNB. The results of the sulphur application diminished in the 2nd year, even when the rate of application had been 2 tonnes/ha. Further, the pH value of the soil was 7 before treatment, 6.1 yr. after an application of sulphur at 2 tonnes/ha., and still 6 after a further year. In the 2nd year, the incidence of infection rose. PCNB did not appear to modify the pH value of the soil appreciably. It had a decisive effect on *Rhizoctonia* [*Corticium solani*: **37**, p. 504], especially when the attack came from the soil during growth of the crop. Used at 100–200 kg./ha. of active material this product appears to be one of the most promising. The mineral and alkaline fertilizers appeared to have no effect on the incidence of *S. scabies*. Two applications of farm manure did not increase the incidence of the disease.

In 1956 naturally infected plots at Quimper, left untreated, and treated with soluble salts of sodium borate (15 kg./ha.), cobalt nitrate (5 kg.), manganese sulphate (500 kg.), ammonium molybdate (2.2 kg.), zinc sulphate (100 kg.), magnesium sulphate (1,000 kg.), and flowers of sulphur (500 kg.) gave, respectively (6 lots of 24 plants) 1.6, 3, 1.6, 24, 4.3, 5, 6.6, and 7.9% marketable tubers.

MACLACHLAN (D. S.). **Machinery and warehouse disinfection in Potato ring rot control.**—*Potato Handb.* 1958, pp. 31–32, 1958.

This note briefly describes disinfection measures against potato ring rot [*Corynebacterium sepedonicum*: **37**, pp. 371, 505], of especial importance to seed potato growers. Quaternary ammonium compounds have proved superior to other disinfectants of equipment. Semesan bel (1 lb./10 gal.) and mercuric chloride (1:1,000 or 500) are recommended for disinfection of cutting knives.

PRUMMEL (J.). **Genezing van kaligebreik bij Aardappelen door bespuiting of overbemesting in een laat stadium.** [Cure of potassium deficiency in Potatoes by spraying or excess fertilizing at a late stage.]—*Landbouwvoorlichting*, **15**, 5, pp. 237–241, 1958.

Drought-induced K deficiency in Eigenheimer and Libertas potatoes was effectively combated in the Wieringenmeer, Netherlands, in 1957 by spraying or soil amendment with K_2O at 60–90 kg./ha. during July; spraying resulted in larger yield increases (up to 35%). KCl tends to cause leaf scorch, but it is cheaper (about $\frac{3}{4}$ the price) than K_2SO_4 , which is harmless, and more readily obtainable.

Glazigheid in Aardappelen, uitsorteren met licht of zout. [Jelly-end rot in Potatoes, sorting out by means of light or salt.]—*Groenten en Fruit*, **11**, 49, pp. 3–4, 1957. [Abs. in *Landbouw-Documentatie*, **14**, 6, p. 175, 1958.]

The severity of jelly-end rot [**37**, p. 441] in the Dutch potato crop of 1957, especially in clay soils, prompted an investigation of 2 methods of sorting out affected tubers. Sound tubers are impermeable to light and therefore exposure to various forms of radiation constitutes a simple method of selection. If sodium chloride is added to a water bath the jellified tubers float while the others sink [cf. **34**, p. 812]. Using the Lockwood Grader, 5 tons/hr. can be sorted on the conveyor belt.

SUZUKI (N.), KASAI (K.), ARAKI (T.), & TAKANASHI (T.). **Studies on the violet root rot of Sweet Potatoes caused by *Helicobasidium mompa* Tanaka. I. The disease invasion under field conditions.**

KASAI (K.) & ARAKI (T.). **II. Effect of thiamine and ascorbic acid on the growth of *Helicobasidium mompa*.**

YAMAZAKI (Y.). **III. Pectic enzymes of the causal fungus.**

ARAKI (T.), YAMAZAKI (Y.), & SUZUKI (N.). **IV. Production of itaconic acid by *Helicobasidium mompa*.**

KASAI (K.), YAMAZAKI (Y.), & SUZUKI (N.). **V. Changes in nitrogen and carbohydrate content in the infected tissues.**

SUZUKI (N.). **VI. Histochemical studies of the infected tissues. (1) Chemical changes as results of infection.**

SUZUKI (N.) & TOYODA (S.). **VI. (2) Stimulated respiration and behaviour of phosphorus in infected tissues and their relation to defence reaction.**—*Bull. nat. Inst. agric. Sci., Tokyo*, 8, Ser. C, pp. 1–28, 6 pl. (1 col.), 3 fig.; pp. 29–36, 1 fig.; pp. 37–52, 9 graphs; pp. 53–60, 4 graphs; pp. 61–68, 3 fig., 1 graph; pp. 69–130, 3 pl. (1 col.), 25 fig.; pp. 131–173, 1 fig., 2 diag., 5 graphs, 1957. [Japanese. Abs. from English summaries.]

In I the life history of *H. mompa* [30, p. 337] and the symptoms in sweet potato are described. Infected tubers are unimportant as sources of reinfection in the spring, which comes about chiefly from the over-wintering, soil-borne sclerotia. The earlier the planting date, the heavier the infection. The pathogen grows on the outside of the sweet potato from June until the end of Sept., when the hyphae from the infection cushion, formed by hyphal penetration into the middle lamellae of the outer cork layer, penetrate this layer and rot the inner starchy tissues. Resistant vars. either slough off the fungus at the point of infection by the formation of a fresh cork layer or, during the period of rapid growth in July–Sept., inhibit further growth of the mycelium once the cork layer has been penetrated, a reaction evidenced by a brown discoloration of the parenchyma.

In II thiamine is shown to be essential for the growth of *H. mompa*. Growth increased with increasing concentrations of ascorbic acid up to 40 mg./100 ml., after which it was inhibitory.

According to results presented in III the pectin methylesterase activity of sweet potato tissues is highest in susceptible vars. *H. mompa* possesses strong protopectinase and pectinase activity.

In IV the production of itaconic acid by the fungus in culture is demonstrated and is considered to aid penetration by lowering the pH and thus increasing the activity of the pectic enzymes.

In V it is reported that during the initial stages of infection insoluble N increases by 10–45% and soluble protein and $\text{NH}_2\text{-N}$ decrease, while starch also decreases and sugars increase. In the next stage a slight increase in starch occurs and a further increase in insoluble N. In the last stage of infection, during rotting, total N and carbohydrate both decrease.

Histochemical studies in VI (1) showed that the resistance of the host is higher when young, decreases at maturity, and even more during storage. Infection causes a decrease of pH due to an accumulation of chlorogenic and caffeic acids, lignification of the cell membranes, accumulation of polyphenols in the middle lamellae, formation of a secondary cork layer, and decomposition of cellulose. Amongst other changes in cell constituents the ipomoeamarone content [cf. 35, p. 710] of necrotic tissue in resistant sweet potatoes is higher than in the inner tissue, but in susceptible vars. this difference is less marked. The polyphenol, ascorbic acid,

and glutathione contents of infected susceptible vars. are lower than of resistant ones.

The information presented in VI (2) has already been noticed in part [37, p. 179]; there is a discussion of defence reactions.

KANTZES (J. G.). Nutrition, pathogenicity, and control of *Monilochaetes infuscans* Ell. & Halst. ex Harter, the incitant of scurf of Sweet potatoes.—*Diss. Abstr.*, 17, 11, pp. 2394–2395, 1958.

The growth rates of 13 isolates of *M. infuscans* [35, p. 546] from 5 different States and a non-pigmented mutant varied, but the max. growth of all occurred on pea decoction agar. Casein hydrolysate was a superior source of N to sodium nitrate. Good growth took place on a synthetic medium supplemented by biotin and thiamine.

In the laboratory 22 vars. and 6 seedling sweet potatoes were inoculated with each isolate by dipping filter paper disks in a standardized suspension of spores and mycelial fragments and placing on the storage roots. The zones of infection round the disks were measured following incubation and used to determine the relative susceptibility. A mixture of Maryland isolates was used to inoculate 27 vars. and 13 seedlings in the field. Greenhouse and field results were similar to those obtained in the laboratory. Under opt. conditions for infection none of the test plants was immune. The non-pigmented mutant was the only non-pathogenic isolate. Greenhouse inoculations extended the host range of *M. infuscans* to include 8 more *Ipomoea* spp. and 1 hybrid.

In a 3-yr. series of experiments naturally-infected roots or the underground parts of infected sprouts prior to planting were dipped in fungicides. This treatment was essential for control of scurf but treatment of bedding stock did not enhance this. The best results were achieved with 2 lb./5 gal. thiram, ferbam, or captan, or 1–1,000 puratized agricultural spray.

VASIL'EV (V. P.) (Editor). Борьба с вредителями и болезнями лесных насаждений. [Control of pests and diseases in forest plantations.]—*Nauch. Trud. Inst. Entomol. Phytopath.*, Kiev, 6, 144 pp., 16 fig., 2 graphs, 1 map, 1955. [Received May 1958.]

This is a collection of articles produced under the auspices of the Ukraine Academy of Science. M. A. TZELLE (pp. 101–111) deals with the fungicidal treatment of pine seeds against seedling damping-off due to a variety of soil fungi; granosan (NIUIF-2) at 3 g./kg. gave 50% more healthy plants and better germination than the control, while 15% thiram gave an equally good result but did not protect the seedlings from may beetle [*Melolontha* sp.] as did thiram. Mme V. D. АРКНІРОВА (pp. 118–126) found that the treatment of acorns with granosan at 0.5% proved the best for control of fungal diseases (including *Sclerotinia pseudotuberosa*) [37, p. 423] and for germination, while at 1% and over it arrested germination without giving better control. The same author (pp. 127–133) reports on a trial with tar water treatment of acorns against development of fungal diseases caused mainly by *Fusarium* spp. [34, p. 196], *Alternaria* spp., and *S. pseudotuberosa*; 1:1 solution of tar water arrested all fungal diseases but decreased germination; 1:5 was the best against mummification, with only 2.1% mummified acorns [cf. 37, p. 423] compared with 10.1% for the control. Against suspected *S. pseudotuberosa* a 3:1 solution was very effective and in this instance germination was 65–67%, as against 0–20% for the control.

M. A. TZELLE & Mme V. A. YAROVAYA (pp. 138–143) report on damage by *Thelephora terrestris*, causing 'asphyxia' of seedlings, in the Kiev region. The sporophores develop closely round the collar of pine saplings arresting branch and needle development, though leaving the root system healthy. The fungus has only

a mechanical effect but in 1953 it was very widespread in the district and caused great damage.

ТЕТЕРЕВНИКОВА-БАБАЯН (Мме D. N.). Болезни древесных пород и кустарников в Котайкском районе Армянской ССР. [Diseases of trees and shrubs in the Kotayksky district in the Armenian S.S.R.]—*Nauch. Trud. erevansk. Univ.*, **33**, pp. 19–49, 1951. [Armenian summary. Received May 1958.]

This work from the Botanical Garden of the Armenian Academy of Science in the Kotayksky district, U.S.S.R. lists over 50 diseases of trees, fruit trees, and shrubs, the majority fungal, some virus, and some physiological. For all the fungal diseases there is a description of the pathogen and control. Ten of the diseases are first records for the Armenian S.S.R.

GÖYRÜ (J.). **Az erdei fák rácos niegbetegedései.** [Canker diseases of forest trees.]—*Erdész., Kutat.*, 1957, 1–2, pp. 83–94, 8 fig., 1957. [Russian, English, and German summaries.]

The different kinds of tree canker in Hungary are described and illustrated. Frost canker occurs mainly on young trees with smooth bark. Poplar canker (*Pseudomonas syringae* f. sp. *populea*) [35, p. 646] is widespread on *Populus robusta*, *P. regenerata*, *P. serotina*, *P. berolinensis*, *P. trichocarpa*, *P. eugenii*, and *P. carrieri*, and is considered by the author to be transmitted by aphids (*Pterocomma populeum*). *Nectria galligena* on broadleaved trees, *N. ditissima* on beech and hornbeam, larch canker (*Dasyscypha* [*Trichoscyphella*] *willkommii*), and fir canker (*Melampsorella caryophyllacearum*) on silver fir (*Abies alba*) are also present. For control of the last, as the alternate weed hosts cannot be removed, the aecidia on *A. alba* should be destroyed. It is advisable to shade the soil of silver fir stands with spruce and beech to keep down weeds.

ESLYN (W. E.). **Decay of Silver Maple (*Acer saccharinum* L.) in central Iowa.**—*Abs. in Iowa St. Coll. J. Sci.*, **32**, 2, pp. 171–172, 1957.

Of 845 silver maple trees, ranging in diam. from 4–30.9 in., in 3 lowland areas, sampled for fungi with an increment borer and examined for fruiting Basidiomycetes, 148 bore sporophores, or furnished cores exhibiting decay, the percentage of those sampled in each area varying from 22 to 39. The incidence of Basidiomycetes increased with increasing age only in the 90 and 100+ age classes. Open wounds accounted for the greatest percentage of total resultant rot in the first 16 ft., followed by swollen knots, and seams and scars.

SHWAZMAN (S. R.), LEONOVA (Мме N. M.), & ANTIPOVA (Мме G. N.). Паразитная и сапрофитная микрофлора Березы бородавчатой в условиях Северного Казахстана. [Parasitic and saprophytic fungal flora on verrucose Birch in the conditions of North Kazakhstan.]—*Trud. Inst. bot. Acad. Sci. Kazakh. S.S.R.*, **4**, pp. 76–110, 1956. [Received May 1958.]

This is an annotated, systematic account of the fungi found on *Betula verrucosa* in Kazakhstan, of which 40 genera (48 spp.) are perfect fungi and 9 (11 spp.) imperfect. The parasites represent 17% and the semiparasitic and saprophytic 83%.

DARPOUX (H.), RIDÉ (M.), & BONDOUX (P.). **Le chancre du Châtaignier causé par l'*Endothia parasitica*.** [Chestnut canker caused by *Endothia parasitica*.]—Reprinted from *Bull. tech. Ing. Serv. agric.* 123, 23 pp., 2 pl. (1 col.), 9 fig., 4 maps, 1957. [102 refs.]

A detailed account in semi-popular terms of chestnut canker and the causal organism [37, p. 317; map 66], together with relevant legislation.

BERTINI (S.). **Intorno ad un seccume delle foglia di *Quercus ilex* L.** [On a drying of the leaves of *Quercus ilex* L.].—*Atti Ist. bot. Univ. Pavia*, Ser. 5, **14** (1-3), pp. 326-328, 1 pl., 1 graph, 1957. [English summary.]

From leaves of *Q. ilex* in Italy bearing large, dried areas, the author isolated a species of *Pestalotia* with conidia $31.98 \pm 0.21 \times 10.04 \pm 0.058 \mu$ and having 3-5 setae $36.5 \pm 0.35 \mu$ long, one at the apex, the others at the base of the distal cell. The pedicel into which the lowest cell lengthened was $4-8 \mu$ and persistent. The fungus appeared to resemble *P. lucae* in its measurements and *P. montellica* in the number and insertion of the setae.

DANCE (B. W.). **A fungus associated with blight and dieback of hybrid Aspen.**—*Bi-m. Progr. Rep. Div. For. Biol. Dep. Agric. Can.*, **13**, 6, pp. 1-2, 1957.

An unidentified *Gloeosporium* sp., conidia $4.1-10.7$ (7) \times $2.5-4.9$ (3.3) μ , is consistently associated with a die-back of the hybrid *Populus alba* \times *P. grandidentata* in Ontario, though neither parent is affected. In mid-summer under-development, discoloration, curling, and necrosis of peripheral leaves, which finally become chocolate brown, occurs sporadically through the crown. In Sept. perithecia, probably of a *Gnomonia* sp., appear in the dead leaves. Susceptibility varies in different clones.

DONAUBAUER (E.). **Über eine Blatt- und Zweigkrankheit der Kanadapappel.** [On a leaf and twig disease of Canadian Poplar.].—*Allg. Forstztg.*, **68**, 23/24, p. 341, 1957.

Increasing attacks of *Venturia populina* [cf. **36**, p. 289; **37**, p. 252] on Canadian poplar [*Populus canadensis* var. *marylandica*] in Austria are reported from the Forstliche Bundesversuchsanstalt Schönbrunn, Vienna, predominantly in June-July 1956. The fungus was found in Upper Austria, near Vienna, near Wiener Neustadt, and on the Danube islands near Tulln. Trees of different ages were attacked, but the disease is particularly dangerous to young poplars. The only satisfactory control would appear to be the development of resistant varieties.

OECHSLIN (M.). **Schädigungen in Aufforstungen im Hochgebirge.** [Pathogenic agencies in afforestations in the high mountains.].—*Schweiz. Z. Forstw.*, **108**, 2, pp. 93-101, 4 fig., 1957. [French summary.]

While *Herpotrichia nigra* is undoubtedly the most widespread fungal pathogen of conifers in high mountain nurseries in the canton of Uri, Switzerland [**34**, p. 328], *Botrytis cinerea*, *Trametes radiciperda* [*Fomes annosus*], the honey fungus [*Armillaria mellea*], and others are also responsible for heavy damage. Chemical treatments with the Ciba product for the control of *H. nigra* should be applied before the onset of snow and after the thaw.

RAYMOND (F. L.) & REID (J.). **Comments on the agents responsible for the canker-ing and killing of Balsam Fir in Eastern Canada.**—*Bi-m. Progr. Rep. Div. For. Biol. Dep. Agric. Can.*, **13**, 6, p. 1, 1957.

Thyronectria balsamea, recently abundant in Ontario, reproduced the cankering, die-back, and needle reddening of *Abies balsamea* [**37**, p. 115] when wound inoculated, but not otherwise. *Dermea balsamea* [cf. **26**, p. 31] and *Cytospora* sp., found associated with the disease, are also widespread, and *Valsa friesii* (possibly the perfect state of the *Cytospora*) and *Fusicoccum abietinum* [**37**, pp. 115, 206] are also associated. It is suggested that a number of these fungi infect the trees by way of insect or mechanical injuries and induce the die-back.

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